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TRANSMITTAL LETTER

Date: June 2, 2009

Client: Olin

Project: 51 Eames Street, Wilmington, MA

MACTEC PN: 6107-09-0016/12

Delivery: U.S.P.S.

☐ purchasing

☐ construction

☐ see remarks

REMARKS: Enclosed please find the following data validation summary reports for the Olin Chemical Superfund Site, Wilmington, Massachusetts.

Prepared By: Annette Savastano

[illegible]Revision
No.

1.

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1

Data Validation Report, February 2009 Slurry Wall Surface Water and Groundwater, Olin Chemical Superfund Site, Wilmington, Massachusetts, TestAmerica Laboratories Data Sets 360-21330 and 360-21354

2

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1

Data Validation Summary, March 2009 Residential Well Samples, Olin Chemical Superfund Site, Wilmington, Massachusetts, TestAmerica Data Set 360-21622, Lancaster Laboratory Data Set OLN14 (1136871)

DISTRIBUTION: T = TRANSMITTAL LETTER; C = COPY OF DOCUMENT

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X	X

X	X
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T	C

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Deliverable Review Form

1 Project Information:

Project Name: Olin Chemical Superfund Site

Project Number: 6107-09-0016

Project Manager: Peter Thompson

Document Name: Data Validation Report - February 2009 Slurry Wall/Cap

Document Revision Number: _____

Revision Date: _____

Prepared By: _____

2 Technical Review: This document has been independently reviewed for technical adequacy, validity, feasibility, continuity, and conformance to client requirements and accepted professional standards. Technical review of this document has been performed by:

Subject Area(s): Initial Data Validation

Printed Name: Wolfgang Calicchio

Signature: _____

Date: 5/22/09

Subject Area(s): Senior Data Validation

Printed Name: Chris Ricardi

Signature: _____

Date: 5/27/09

Subject Area(s): QC Review

Printed Name: _____

Signature: _____

Date: _____

3 Tables/Figures/Appendices (including calculations) Review: Independently reviewed for technical adequacy, continuity, and conformance to regulatory requirements and accepted professional standards (use back of form if more room is needed). Reviews performed by:

List of reviewed Tables/Figures/Appendices: Table 1 - Sample Summary

Created by: KJC 03/17/09

Checked by: WDC 05/19/09

Date: 5/19/09

List of reviewed Tables/Figures/Appendices: Table 2 - Final Results Summary

Created by: KJC 05/26/09

Checked by: WD/CR

Date: 5/27/2009

List of reviewed Tables/Figures/Appendices: _____

Created by: _____

Checked by: _____

Date: _____

List of reviewed Tables/Figures/Appendices: _____

Created by: _____

Checked by: _____

Date: _____

4 Certifying Project Manager: I certify that this document has been reviewed and edited prior to release and is in conformance with the company's standards for technical and document quality:

Print Name: Peter Thompson

Signature: _____

Date: _____

5 Certifying Project Principal: I certify that this document has been reviewed and edited prior to release and is in conformance with the company's standards for technical and document quality:

Print Name: Michael Murphy

Signature: _____

Date: _____

6 Policy ES-4 Contract Requirements: Contract = Contract, Subcontract, Work Order, Change Order, or PO

☐ NA

☐ This is a Standard Contract

☐ This is a Non-Standard Contract * and was checked & stamped by an OCA or MACTEC Attorney

* Client-generated contracts and/or any mods to PWAS/other standard company contracts shall be reviewed by an OCA. See Policies LD-6, LD-7 and LD-30 for more information.

All Contracts - Client must sign two copies of the contract first, then return them to MACTEC for our signature on both copies. MACTEC returns one signed contract to Client, and stamps one File Copy for MACTEC's project files.)

Back of form to be completed by Annette\Project Assistant.

Deliverable Review Form (Continued)

Sections 7-9 to be Completed by Annette\Project Assistant

- 7 Copy Editing:** This document has been checked to ensure correct spelling, grammar, and word usage; completeness (no missing text, figures, tables); accuracy (index, page numbers, internal references); continuity of style; and conformance to specified format and style requirements (whether MACTEC format or client requested format). Copy editing of this document was performed by:

Print Name: _____

Signature: _____

Date: _____

- 8 Policy ES-4 Requirements (Proposals, Reports & Other Client Deliverables):** Check all that apply below.

☐
☐
☐
☐
☐

MACTEC's copy is a "duplicate original" of the client's original and is stamped "File Copy"

This is a Draft - Transmittal signed by Principal is attached to Client's & MACTEC's File Copy

This is a Final - Project Manager & Principal wet signatures on Client's & MACTEC's File Copy

And all Tables/Figures/Appendices have wet initials for Reviewed By/Checked By per QA Policy

This is a PDF electronic delivery sent via email. A printout of the deliverable that was sent to client

and a copy of the transmittal email sent to the client is attached to the printout and stamped File Copy

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If Absentee Signature was used - Approval from absentee is attached to File Copy (see policy update below).

Absentee Signature Policy Update - The authorized employee should sign their own name and the phrase

"for _____ with permission." Documentation of permission to sign must be included with File Copy.

- 9 Timeliness Database:** ☐ NA

Original Deliverable Due Date: _____

Actual Delivery Date: _____

Variance Explanation (if applicable): _____

- 10 Use this space for any additional notes/comments/signatures:**



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Home Page: www.mactec.com

To: Steve Morrow
From: Chris Ricardi
Date: June 2, 2009
Subject: Interim Response Steps Work Plan Slurry Wall Monitoring Program 1Q09– February 2009

**DATA VALIDATION REPORT
FEBRUARY 2009 SLURRY WALL SURFACE WATER AND GROUNDWATER
OLIN CHEMICAL SUPERFUND SITE
WILMINGTON, MASSACHUSETTS
TestAmerica Laboratories Data Sets 360-21330 and 360-21354**

1.0 INTRODUCTION

Surface water and groundwater samples were collected from the Olin Chemical Superfund Site from February 24 to 25, 2009. Samples were analyzed by TestAmerica Laboratories in Westfield, Massachusetts. Data were reported in sample delivery groups (SDGs) 360-21330 and 360-21354. A summary of samples included in this review is contained in Table 1. Samples reviewed in this report were analyzed for the following USEPA SW-846 (USEPA, 1996), USEPA wastewater (USEPA, 1993), or Standard Methods (APHA, 1995):

- dissolved and total metals (aluminum, chromium, and sodium) by USEPA Method 6010B in surface water
- dissolved metals (aluminum and chromium) by USEPA Method 6010B in groundwater
- general chemistry analyses for ammonia by Method 350.1 (Lachat 10-107-06-1), chloride, sulfate, nitrate, and nitrite by Method 300, and specific conductance by SM18 SM 2510B

The Draft Interim Response Steps Work Plan (MACTEC, 2007) and the MADEP Compendium of Quality Assurance and Quality Control Requirements and Performance Standards for Selected Analytical Methods Used in Support of Response Actions for the Massachusetts Contingency Plan (MCP) [MADEP, 2004] were used as a reference during the review. Analytical packages were reviewed using the Level 1 Data Quality Evaluation checklists that were developed for the Olin Wilmington annual and quarterly groundwater monitoring tasks. Final sample results are presented on data summaries in Table 2.

2.0 METALS

Data were reviewed for the following parameters:

- * Data Completeness
- * Holding Time
- Blanks



- * Matrix Spike Analysis
- * Laboratory Duplicate Analysis
- * Field Duplicate Results
- * Laboratory Control Sample
- * Detection Limits

* = indicates that criteria were met for this parameter

Blanks

Dissolved aluminum (6.1 µg/L) was reported in the method blank associated with all samples in SDG 360-21330. An action level (30.5 µg/L) was calculated at five times the blank concentration and compared to sample data. The low concentration detection of dissolved aluminum in sample OC-GW-25 was qualified non-detected (U) at the reporting limit.

The laboratory qualified sample results with a (B) when the analyte was detected in the sample and associated method blank. The (B) qualifier was removed from the final data set.

3.0 GENERAL CHEMISTRY – Ammonia, Chloride, Sulfate, Nitrate, Nitrite, and Specific Conductance

Data were reviewed for the following parameters:

- * Data Completeness
- * Holding Time
- * Blanks
- * Matrix Spike Analysis
- * Laboratory Duplicate Analysis
- * Laboratory Control Sample
- * Detection limits

* = indicates that criteria were met for this parameter

Matrix Spike Results

A chloride MS/MSD analysis was completed using sample OC-GW-202D. The chloride MS/MSD percent recoveries (70 and 66) are less than the lower project limit of 75. Results for chloride in all samples were qualified estimated (J) and are considered potentially biased low.



Except for the validation actions noted above, the results are interpreted to be usable as reported by TestAmerica.

A handwritten signature in cursive script that reads "Chris Ricardi".

6/02/09

Chris Ricardi, NRCC-EAC
Senior Chemist

Date

A handwritten signature in cursive script that reads "Michael Murphy".

Michael Murphy
Project Principal

Date

6/2/09

Reference:

American Public Health Association (APHA), 1995. "Standard Methods for Examination of Water and Wastewater"; 19th Edition; APHA, 1015 Fifteenth St., NW. Washington, D.C. 20005.

MACTEC, 2007. "Draft Interim Response Steps Work Plan"; Olin Chemical Superfund Site; 51 Eames Street, Wilmington, Massachusetts; July 25, 2007.

U.S. Environmental Protection Agency (USEPA), 1993. "Methods for Chemical Analysis and Water and Wastes (MCAWW)", EPA/600/4-79-020 (March 1983) with updates and supplements EPA/600/4-91-010 (June 1991), EPA/600/R-92-129 (August 1992) and EPA/600/R-93-100 (August 1993).

U.S. Environmental Protection Agency (USEPA), 1996. "Test Methods for Evaluating Solid Waste"; Laboratory Manual Physical/Chemical Methods; Office of Solid Waste and Emergency Response; Washington, DC; SW-846; November 1986; Revision 4 -December 1996.



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Table 1 – FEBRUARY 2009 SLURRY WALL MONITORING PROGRAM

Lab Sample ID	Location	Sample ID	Sample Date	SW846 6010B Total	SW846 6010B Filtered	E350.1 (QuickChem 10-107-06-1- B)	SM 2510B	40CFR136A 300.0
<i>Groundwater</i>								
360-21330-8	GW-25	OC-GW-25	2/24/2009		2	1	1	2
360-21354-1	GW-202S	OC-GW-202S	2/25/2009		2	1	1	2
360-21354-2	PZ-18R	OC-PZ-18R	2/25/2009		2	1	1	2
360-21354-3	GW-79S	OC-GW-79S	2/25/2009		2	1	1	2
360-21354-4	PZ-17RR	OC-PZ-17RR	2/25/2009		2	1	1	2
360-21354-5	GW-202D	OC-GW-202D	2/25/2009		2	1	1	2
360-21354-6	GW-78S	OC-GW-78S	2/25/2009		2	1	1	2
<i>Surface Water</i>								
360-21330-1	ISCO3	OC-ISCO-3	2/24/2009	3	3	1	1	4
360-21330-2	ISCO2	OC-ISCO-2	2/24/2009	3	3	1	1	4
360-21330-3	PZ-16RR	OC-PZ-16RRSW	2/24/2009	3	3	1	1	4
360-21330-4	PZ-17RR	OC-PZ-17RRSW	2/24/2009	3	3	1	1	4
360-21330-5	SD-17	OC-SD-17	2/24/2009	3	3	1	1	4
360-21330-6	PZ-18R	OC-PZ-18RSW	2/24/2009	3	3	1	1	4
360-21330-7	ISCO1	OC-ISCO-1	2/24/2009	3	3	1	1	4

Notes:

Number listed under method indicates number of target analytes reported.

Prepared
 by/Date: KJC 03/17/09
 Checked
 by/Date: WDC 5/19/09

Table 2
Final Results Summary - 360-21330 & 360-21354
February 2009 Slurry Wall / Cap Groundwater and Surface Water
Olin Chemical Superfund Site
Wilmington, Massachusetts

				Loc Name		GW-202D		GW-202S		GW-25		GW-78S		GW-79S	
				Field Sample ID		OC-GW-202D		OC-GW-202S		OC-GW-25		OC-GW-78S		OC-GW-79S	
				Field Sample Date		02/25/09		02/25/09		02/24/09		02/25/09		02/25/09	
				QC Code		FS		FS		FS		FS		FS	
				Lab Sample Delivery Group		360-21354-1		360-21354-1		360-21330-1		360-21354-1		360-21354-1	
Frac	Method	Analyte	Units	Result		Qual		Result		Qual		Result		Qual	
F	SW6010	Aluminum	ug/l	14000				100 U				100 U		18 J	
F	SW6010	Chromium	ug/l	940				4.3 J				4.9 J		6.6	
N	E300	Chloride	mg/l	300 J				50 J				39 J		170 J	
N	E300	Sulfate	mg/l	2000				500				140		620	
N	LACH_107_06_1_B	Nitrogen, as Ammonia	mg/l	360				99				43		94	
N	SM2510B	LAB SPECIFIC CONDUCTANCE	umhos/cm	5100				1400				650		1340	

Notes:

N = normal

F = filtered

FS = field sample

U = not detected, value is the detection limit

J = value is estimated

ug/l = microgram per liter

mg/l = milligram per liter

umhos/cm = micro reciprocal ohms per centimeter

Table 2
Final Results Summary - 360-21330 & 360-21354
February 2009 Slurry Wall / Cap Groundwater and Surface Water
Olin Chemical Superfund Site
Wilmington, Massachusetts

				Loc Name		PZ-17RR		PZ-18R	
				Field Sample ID		OC-PZ-17RR		OC-PZ-18R	
				Field Sample Date		02/25/09		02/25/09	
				QC Code		FS		FS	
				Lab Sample Delivery Group		360-21354-1		360-21354-1	
Frac	Method	Analyte	Units	Result		Qual		Result	
F	SW6010	Aluminum	ug/l	4.6		J		4.6	
F	SW6010	Chromium	ug/l	2.9		J		15	
N	E300	Chloride	mg/l	17		J		130	
N	E300	Sulfate	mg/l	510				220	
N	LACH_107_06_1_B	Nitrogen, as Ammonia	mg/l	75				76	
N	SM2510B	LAB SPECIFIC CONDUCTANCE	umhos/cm	1400				1000	

Notes:

N = normal

F = filtered

FS = field sample

U = not detected, value is the detection limit

J = value is estimated

ug/l = microgram per liter

mg/l = milligram per liter

umhos/cm = micro reciprocal ohms per centimeter

Prepared by / Date: KJC 05/26/09

Checked by / Date: WDC 05/27/09

Table 2
Final Results Summary - 360-21330 & 360-21354
February 2009 Slurry Wall / Cap Groundwater and Surface Water
Olin Chemical Superfund Site
Wilmington, Massachusetts

				ISCO1		ISCO2		ISCO3		PZ-16RR		PZ-17RR	
				OC-ISCO-1		OC-ISCO-2		OC-ISCO-3		OC-PZ-16RRSW		OC-PZ-17RRSW	
				02/24/09		02/24/09		02/24/09		02/24/09		02/24/09	
				FS		FS		FS		FS		FS	
				360-21330-1		360-21330-1		360-21330-1		360-21330-1		360-21330-1	
Frac	Method	Analyte	Units	Result	Qual	Result	Qual	Result	Qual	Result	Qual	Result	Qual
F	SW6010	Aluminum	ug/l	280		800		39 J		1300		2200	
F	SW6010	Chromium	ug/l	40		160		0.38 J		340		440	
F	SW6010	Sodium	ug/l	98000		100000		100000		120000		110000	
N	E300	Chloride	mg/l	140 J		120 J		200 J		150 J		140 J	
N	E300	Nitrate as N	mg/l	0.4		0.81		1.1		0.49		0.48	
N	E300	Nitrite as N	mg/l	0.1 U		0.01 U		0.1 U		0.1 U		0.1 U	
N	E300	Sulfate	mg/l	94		210		53		240		240	
N	LACH_107_06_1_B	Nitrogen, as Ammonia	mg/l	18		42		3.3		41		34	
N	SM2510B	LAB SPECIFIC CONDUCTANCE	umhos/cm	730		900		820		1000		1000	
T	SW6010	Aluminum	ug/l	350		1300		470		3000		3500	
T	SW6010	Chromium	ug/l	44		250		4.3 J		740		880	
T	SW6010	Sodium	ug/l	90000		91000		91000		110000		120000	

Notes:

N = normal

T = total (unfiltered)

F = filtered

FS = field sample

U = not detected, value is the detection limit

J = value is estimated

ug/l = microgram per liter

mg/l = milligram per liter

umhos/cm = micro reciprocal ohms per centimeter

Table 2
Final Results Summary - 360-21330 & 360-21354
February 2009 Slurry Wall / Cap Groundwater and Surface Water
Olin Chemical Superfund Site
Wilmington, Massachusetts

				Loc Name	PZ-18R	SD-17	
				Field Sample ID	OC-PZ-18RSW	OC-SD-17	
				Field Sample Date	02/24/09	02/24/09	
				QC Code	FS	FS	
				Lab Sample Delivery Group	360-21330-1	360-21330-1	
Frac	Method	Analyte	Units	Result	Qual	Result	Qual
F	SW6010	Aluminum	ug/l	230		1500	
F	SW6010	Chromium	ug/l	36		390	
F	SW6010	Sodium	ug/l	100000		130000	
N	E300	Chloride	mg/l	150 J		160 J	
N	E300	Nitrate as N	mg/l	0.41		0.45	
N	E300	Nitrite as N	mg/l	0.1 U		0.1 U	
N	E300	Sulfate	mg/l	91		240	
N	LACH_107_06_1_B	Nitrogen, as Ammonia	mg/l	17		37	
N	SM2510B	LAB SPECIFIC CONDUCTANCE	umhos/cm	740		1100	
T	SW6010	Aluminum	ug/l	370		3400	
T	SW6010	Chromium	ug/l	47		870	
T	SW6010	Sodium	ug/l	100000		120000	

Notes:

N = normal

T = total (unfiltered)

F = filtered

FS = field sample

U = not detected, value is the detection limit

J = value is estimated

ug/l = microgram per liter

mg/l = milligram per liter

umhos/cm = micro reciprocal ohms per centimeter

Prepared by / Date: KJC 05/26/09

Checked by / Date: CSR 05/27/09

LEVEL I DATA QUALITY EVALUATION

STANDARD OPERATING PROCEDURE AND CHECKLIST
WET CHEMISTRY PARAMETERS BY VARIOUS METHODS

Reviewer/Date Chris Ricard 5/18/09
 Sr. Review/Date Chris Ricard 5/27/09
 Lab Report # 300-21330-1
 Project # 610709226.12

ammonia, chloride, sulfate, nitrate, nitrite

Note: The following analyses will be evaluated according to the "MADEP QA/QC Guidelines for Sampling, Data Evaluation and Reporting Activities." MADEP, however, may not list QA/QC criteria for every chemical analysis. Where not defined by MADEP, criteria will default to values stipulated in the QAPP. Where the QAPP does not define criteria, QA/QC requirements will default to limits employed by the laboratory.

1.0 Laboratory Deliverable Requirements

1.1 Laboratory Information: Was all of the following provided in the laboratory report? Yes ☒ No ☐ N/A ☐ Comments:

☒ Name of Laboratory ☒ Address ☒ Project ID ☒ Phone # ☒ Sample Identification – Field and Laboratory
☒ Client Information ☒ Name ☒ Address ☒ Client Contact (IDs must be cross-referenced)

ACTION: If no, contact lab for submission of missing or illegible information.

1.2 Laboratory Report Certification Statement

Does the laboratory report include a completed Analytical Report Certification in the required format? Yes ☒ No ☐ N/A ☐ Comments:

ACTION: If no, contact lab for submission of missing certification or certification with correct format.

1.3 Laboratory Case Narrative:

Yes ☒ No ☐ N/A ☐ Comments:

☒ Narrative serves as an exception report for the project and method QA/QC performance. ☐ Narrative includes an explanation of each discrepancy on the Certification Statement.

ACTION: If no, contact lab for submission of missing or illegible information.

1.4 Chain of Custody (COC) copy present with all documentation completed? Yes ☒ No ☐ N/A ☐ Comments:

Does the laboratory report include copies of Chain of Custody forms containing all samples in this SDG?

NOTE: Olin receives and maintains the *original* COC.

ACTION: If no, contact lab for submission of copy of missing completed COC.

1.5 Sample Receipt Information (Cooler Receipt Form): Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?

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LEVEL I DATA QUALITY EVALUATION
STANDARD OPERATING PROCEDURE AND CHECKLIST
WET CHEMISTRY PARAMETERS BY VARIOUS METHODS

Yes ☒ No ☐ N/A ☐ Comments:

☒ Sample temperature confirmed: must be 1° - 10° C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply).

☒ Container type noted ☒ Condition observed ☒ pH verified (where applicable) ☒ Field and lab IDs cross referenced

ACTION: If no, contact lab for submission of missing or incomplete documentation.

1.5.1 Were the correct bottles and preservatives used?

Yes ☒ No ☐ N/A ☐ Comments:

☒ Ammonia, - 1 Liter polyethylene/H₂SO₄ to pH<2, cool to 4°C

Oil & Grease - 1 Liter glass/HCL or H₂SO₄ to pH<2, cool to 4°C

Alkalinity - 1 Liter polyethylene/cool to 4°C

Chemical Oxygen Demand - 50 mL polyethylene/H₂SO₄ to pH<2, cool to 4°C

Chloride, pH, sulfate, nitrate, nitrite - 50 mL polyethylene/cool to 4°C

Nitrate/nitrite - H₂SO₄ to pH<2, cool to 4°C

Organic Carbon - 500 mL amber glass bottle/HCL or H₂SO₄ to pH<2, cool to 4°C

Sulfide - 50 mL polyethylene/ZnAcetate + NaOH to pH>9, cool to 4°C

Phenolics - H₂SO₄ to pH<2, cool to 4°C

Specific conductance, TDS, TSS - 100 mL polyethylene/cool to 4°C

ACTION: If no, inform senior chemist. Document justification for change in container/volume (if applicable), qualify positive and non-detect data (J) data if cooler temperature exceeds 10°C. Rejection of data requires professional judgment

Yes ☒ No ☐ N/A ☐ Comments:

1.5.2 Were all samples delivered to the laboratory without breakage?

1.5.3 Does the Cooler Receipt Form or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data?

Yes ☐ No ☒ N/A ☐ Comments:

OLIN-WILMINGTON
LEVEL I DATA QUALITY EVALUATION
STANDARD OPERATING PROCEDURE AND CHECKLIST
WET CHEMISTRY PARAMETERS BY VARIOUS METHODS

1.6 Sample Results Section: *Was the following information supplied in the laboratory report for each sample?*

<input checked="" type="checkbox"/> Field ID and Lab ID	<input checked="" type="checkbox"/> Date and time collected	<input checked="" type="checkbox"/> Analyst Initials	<input checked="" type="checkbox"/> Dilution Factor	<input checked="" type="checkbox"/> % moisture or solids	<input checked="" type="checkbox"/> Reporting limits
<input checked="" type="checkbox"/> Clean-up method	<input checked="" type="checkbox"/> Analysis method	<input checked="" type="checkbox"/> Preparation method	<input checked="" type="checkbox"/> Date of preparation/extraction/digestion clean-up and analysis, where applicable		
<input checked="" type="checkbox"/> Matrix	<input checked="" type="checkbox"/> Target analytes and concentrations		<input checked="" type="checkbox"/> Units (soils must be reported in dry weight)		

ACTION: If no, contact lab for submission of missing or incomplete information.

1.7 QA/QC Information: *Was the following information provided in the laboratory report for each sample batch?*

☒ Method blank results ☒ LCS recoveries ☒ MS/MSD recoveries and RPDs ☒ Laboratory duplicate results (where applicable)

ACTION: If no, contact lab for submission of missing or incomplete information.

2.0 Holding Times

Have any technical holding times, determined from date of collection to date of analysis, been exceeded? The holding times are as follows:

☒ 28 days = ammonia, chemical oxygen demand, chloride, organic carbon, oil & grease, specific conductance, total organic carbon and sulfate

Alkalinity = 14 days Sulfide, TDS, TSS = 7 days pH = analyze immediately Nitrate nitrogen as N = 48 hrs

Nitrite nitrogen as N = 48 hrs Nitrate + Nitrite as N = 28 days

NOTE: List samples that exceed hold time with # of days exceeded on checklist

ACTION: If technical holding times are exceeded qualify results (J). For water samples that are grossly exceeded (>2X hold time) reject (R) all non-detect results. Professional judgment used to qualify soils.

3.0 Laboratory Method

3.1 Was the correct laboratory method used?

Yes ☒ No ☐ N/A ☐ Comments:

ACTION: If no, contact lab to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change or to request variance.

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LEVEL I DATA QUALITY EVALUATION
STANDARD OPERATING PROCEDURE AND CHECKLIST
WET CHEMISTRY PARAMETERS BY VARIOUS METHODS

3.2 Are the practical quantitation limits the same as those specified by the ☒ QAPP/IRSWP ☐ Lab?

Yes ☐ No ☒

N/A ☐

Comments:

The laboratory reporting limit for specific conductivity (umhos/cm) is lower than the specified limit of 3 umhos/cm. No further action required.

Note: The MADEP QA/QC Guidelines do not yet list PQLs for wet chemistry analyses, therefore all criteria will default to values stipulated in the QAPP*. Where the QAPP does not define criteria, QA/QC requirements default to limits employed by the lab**. Other criteria may also apply.

Ammonia* ☒ = 0.1 mg/L

Alkalinity** ☐ = 1 mg/L

Bicarbonate Alkalinity** ☐ = 1 mg/L

Carbonate Alkalinity** ☐ = 1 mg/L

Nitrate Nitrogen as N* ☒ = .05 mg/L

Nitrite Nitrogen as N* ☒ = .01 mg/L

Chloride* ☒ = 1 mg/L

Hardness * ☐ = 2 mg/L

Spec. Cond.** ☒ 3 umhos/cm

Total Organic Carbon** ☐ = 1 mg/L

Oil & Grease* ☐ = 5.5 mg/L

Sulfate (EPA 300.0)* ☒ = 2 mg/L

COD:* Low - 20 mg/L

COD* High - 50 mg/L ☐

TDS* ☐ = 10 mg/L

TSS* ☐ = 5 mg/L

pH* ☐ < 2 to > 12

Phenolic - 0.01 mg/L

Other parameter(list) _____

☐ Source of PQL = _____

Other parameter(list) _____

☐ Source of PQL = _____

ACTION: If no, evaluate change with respect to sample matrix, preparation, dilution, moisture, etc. If sample PQL is indeterminate, contact lab for explanation.

3.3 Are the appropriate parameter results present for each sample in the SDG?

Yes ☒

No ☐

N/A ☐

Comments:

ACTION: If no, check Request for Analysis to verify if method was ordered and COC to verify that it was sent, and contact lab for resubmission of the missing data

3.4 If dilutions were required, were dilution factors reported?

Yes ☒

No ☐

N/A ☐

Comments:

ACTION: If no, contact the lab for submission.

4.0 Method Blanks

Yes ☒

No ☐

N/A ☐

Comments:

4.1 Are the Method Blank Summaries present?

ACTION: If no, call the laboratory for submission of missing data.

4.2 Was a method blank analyzed for each analysis batch of wet chemistry field samples of 20 or less?

Yes ☒

No ☐

N/A ☐

Comments:

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ACTION: If no, document discrepancy in case narrative and contact lab for justification. Consult senior chemist for action needed.

4.3 Is the method blank less than the PQL? (See Section 3.2 for PQLs). Yes ☒ No ☐ N/A ☐ Comments:

4.4 Do any method blanks have positive results for wet chemistry parameters? Qualify data according to the following: Yes ☐ No ☒ N/A ☐ Comments:

If the sample concentration is $< 5 \times$ blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is $> 5 \times$ blank value, no qualification is needed.

ACTION: If any blank has positive results, list all the concentrations detected and flagging level (flagging level = $5 \times$ blank value) on the checklist. List all affected samples and their qualifiers.

5.0 Laboratory Control Standards

5.1 Was a laboratory control standard (LCS) run with each analytical batch of 20 samples or less? Yes ☒ No ☐ N/A ☐ Comments:

ACTION: If no, call laboratory for LCS form submittal. If data is not available, use professional judgment to determine qualification actions for data associated with the batch.

5.2 Is a LCS Summary Form present? Yes ☒ No ☐ N/A ☐ Comments:

ACTION: If no, contact lab for resubmission of missing data.

5.3 Is any wet chemistry analyte LCS recovery outside the control limits? Yes ☐ No ☒ N/A ☐ Comments:

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LCS Limits:

Alkalinity** <input type="checkbox"/> = 80-120%	Bicarbonate Alkalinity** <input type="checkbox"/> = 80-120%	Carbonate Alkalinity** <input type="checkbox"/> = 80-120%	Specific Conductivity * <input checked="" type="checkbox"/> = 80-120%
Total Organic Carbon** <input type="checkbox"/> = 80-120%	TDS** <input type="checkbox"/> = 80-120%	Oil & Grease* <input type="checkbox"/> = 80-120%	Ammonia Nitrogen as N* <input checked="" type="checkbox"/> = 80-120%
COD Low* <input type="checkbox"/> = 80-120%	COD High* <input type="checkbox"/> = 80-120%	Nitrate Nitrogen as N** <input checked="" type="checkbox"/> = 80-120%	Nitrite Nitrogen as N** <input checked="" type="checkbox"/> = 80-120%
Hardness* <input type="checkbox"/> = 80-120%	Chloride* <input checked="" type="checkbox"/> = 80-120%	Sulfate (EPA 300.0)* <input checked="" type="checkbox"/> = 80-120%	pH* <input type="checkbox"/> = 98-102% TSS* NA
Other parameter(list) _____ %R = _____		<input type="checkbox"/> Rec Limits= _____	
Other parameter(list) _____ %R = _____		<input type="checkbox"/> Rec Limits = _____	

(MADEP has not yet defined LCS recovery limits for wet chemistry analyses.)

ACTION: If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit, qualify all positive and no-detect results within the batch as (J). If LCS recovery is <10%, non-detect results are rejected (R).

6.0 Matrix Spikes

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

6.1 Were project-specific MS/MSDs analyzed? List project samples that were spiked.

ACTION: If no, contact senior chemist to see if any were specified. Yes ☐ No ☒ N/A ☐ Comments:

6.2 Is the MS/MSD Recovery Form present?

ACTION: If no, contact lab for resubmission of missing data. Yes ☐ No ☐ N/A ☒ Comments:

6.3 Were matrix spikes analyzed at the required frequency of 1 per 20 samples per matrix?

Yes ☐ No ☐ N/A ☒ Comments:

ACTION: If any matrix spike data is missing, call lab for resubmission.

6.4 Are any wet chemistry analyte spike recoveries outside of the QC limits?

Yes ☐ No ☐ N/A ☒ Comments:

Note: The chloride MS/MSD percent recoveries (70 and 66), in SDG 300-21354, are less than the lower QC limit. All chloride results were qualified as estimated (E) and are considered potentially biased low.

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NOTE: %R = (SSR-SR) x 100%
Where: SSR = Spiked sample result
SR = sample result

SA = Spike added

MS/MSD Recovery Limits:

Alkalinity* = NA

Chloride*(SM 4500 Cl) □= 75-125%

Oil & Grease* = NA

Nitrite Nitrogen as N^{**} $\square = 75-125\%$

Other parameter(list) %R =

Bicarbonate Alkalinity* = NA

Specific Conductivity * = NA

COD Low* $\square = 75-125\%$

Hardness* $\square = 75-125\%$

Carbonate alkalinity* = NA

Total Organic Carbon* = NA

COD High* □ = 75-125%

Sulfate (EPA 300.0)* □ = 75-

Ammonia* (LACHAT) □ = 75-125%

TDS**=NA

Nitrate Nitrogen as N^{**} $\square = 75-125\%$

$$\text{pH}^* = \text{NA} \quad \text{TSS}^* = \text{NA}$$

□ Rec Limits =

* = Laboratory Limits
** = Olin QAPP Limits
(MADEP has not yet defined LCS recovery limits for wet chemistry analyses.)

NOTES: 1) If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags.
2) If the MS/MSD was performed by the laboratory on a non-project sample, no qualification is required.

ACTION: MS/MSD flags only apply to the sample spiked. Do not evaluate if sample concentration is $> 4X$ spike. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit but $> 30\%$, qualify both positive results and non-detects (J). If the MS/MSD recovery is $< 30\%$ and the sample is non-detect, the results are considered unusable and flagged (R).

ACTION: Laboratory control limits apply when spiked sample results fall within the normal calibration range. If dilutions are required due to high sample concentrations, the data is evaluated, but no flags are applied.

6.5 Are any RPDs for MS/MSD recoveries outside of the QA/QC limits?

NOTE: $RPD = \frac{S - D}{(S + D)/2} \times 100\%$ Where S = MS result
D = MSD result

Yes	No	Comments:
<input type="checkbox"/>	<input checked="" type="checkbox"/>	N/A

MS/MSD RPD Limits:

RPD ≤ 20

7.0 Laboratory Duplicate

Are the RPDs for the laboratory duplicates <20% unless otherwise specified below?

	Yes	No	N/A	Comments:

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ACTION: If the RPD is greater than specified limits, qualify all results for that analyte as estimated (J).

pH* ☐ = 3% Specific Conductivity *☐ = 5% TSS** ☐ = 6% TDS** ☐ = 6%

8.0 **Sampling Accuracy**

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected.

8.1 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist. Yes ☐ No ☒ N/A ☐ Comments:

8.2 Do any rinsate blanks have positive results? Yes ☐ No ☐ N/A ☒ Comments:

ACTION: Evaluate rinsate results vs. blank results to determine if contaminant may be laboratory-derived. If not lab-related, qualify according to the table below.
 If the sample concentration is $< 5 \times$ blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is $> 5 \times$ blank value, no qualification is needed.

NOTE: MADEP does not require the collection of rinsate blanks.

9.0 **Field Duplicates**

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates. Yes ☐ No ☒ N/A ☐ Comments:

9.2 Were field duplicates collected per the required frequency? Yes ☐ No ☐ N/A ☒ Comments:

QAPP/IRSWP ☐ MADEP Option 1(1 per 20) ☐ MADEP Option 3 (1 per 10) ☐

9.3 Was the RPD $\leq 30\%$ for waters $\leq 50\%$ for soils? Calculate the RPD for results and attach to this review. Yes ☐ No ☐ N/A ☒ Comments:

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ACTION: Qualify data (I) for both sample results if the RPD exceeded.

Was any of the data qualified?

*
Yes ☒

No ☒

N/A ☐

Comments:

If so, apply data qualifiers directly to the DQE copy of laboratory report and flag pages for entry in database.

* Refer to Matrix spikes section 6.4.

REFERENCES:-

MACTEC, 2007. "Draft Interim Response Steps Work Plan"; Olin Chemical Superfund Site, 51 Eames Street, Wilmington, Massachusetts.; Project No. 6300-06-0010/41.1; July 25, 2007.

Massachusetts Department of Environmental Protection (MADEP), 2004. "The Compendium of Quality Assurance and Quality Control Requirements and Performance Standards for Selected Analytical Methods Used in Support of Response Actions for the Massachusetts Contingency Plan (MCP)"; Bureau of Waste Site Cleanup; 1 Winter Street, Boston, Massachusetts 02108; WSC-CAM; May 2004.

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Reviewer/Date

Sr. Review/Date

Lab Report #

Project #

5/13/09
Chris Riccardi, 5/12/09
360-21354-1
6107090016.12

ammonia, chloride, sulfate

Note: The following analyses will be evaluated according to the "MADEP QA/QC Guidelines for Sampling, Data Evaluation and Reporting Activities." MADEP, however, may not list QA/QC criteria for every chemical analysis. Where not defined by MADEP, criteria will default to values stipulated in the QAPP. Where the QAPP does not define criteria, QA/QC requirements will default to limits employed by the laboratory.

1.0 Laboratory Deliverable Requirements

1.1 Laboratory Information: Was all of the following provided in the laboratory report? Yes ☒ No ☐ N/A ☐ Comments:

Check items received.

☒ Name of Laboratory ☒ Address ☒ Project ID ☒ Phone # ☒ Sample Identification – Field and Laboratory
(IDs must be cross-referenced)
☒ Client Information: ☒ Name ☒ Address ☒ Client Contact

ACTION: If no, contact lab for submission of missing or illegible information.

1.2 Laboratory Report Certification Statement

Does the laboratory report include a completed Analytical Report Certification in the required format?

ACTION: If no, contact lab for submission of missing certification or certification with correct format.

1.3 Laboratory Case Narrative:

☒ Narrative serves as an exception report for the project and method QA/QC performance.

☐ Narrative includes an explanation of each discrepancy on the Certification Statement.

ACTION: If no, contact lab for submission of missing or illegible information.

1.4 Chain of Custody (COC) copy present with all documentation completed? Yes ☒ No ☐ N/A ☐ Comments:

Does the laboratory report include copies of Chain of Custody forms containing all samples in this SDG?

NOTE: Olin receives and maintains the original COC.

ACTION: If no, contact lab for submission of copy of missing completed COC.

1.5 Sample Receipt Information (Cooler Receipt Form): Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?

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Yes ☒ No ☐ N/A ☐ Comments:

☒ Sample temperature confirmed: must be 1° - 10° C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply).

☒ Container type noted ☒ Condition observed ☒ pH verified (where applicable) ☒ Field and lab IDs cross referenced

ACTION: If no, contact lab for submission of missing or incomplete documentation.

1.5.1 Were the correct bottles and preservatives used?

Yes ☒ No ☐ N/A ☐ Comments:

☒ Ammonia, - 1 Liter polyethylene/H₂SO₄ to pH<2, cool to 4°C

Oil & Grease - 1 Liter glass/HCL or H₂SO₄ to pH<2, cool to 4°C

Alkalinity - 1 Liter polyethylene/cool to 4°C

Chemical Oxygen Demand - 50 mL polyethylene/H₂SO₄ to pH<2, cool to 4°C

☒ Chloride, pH, sulfate, nitrate, nitrite - 50 mL polyethylene/cool to 4°C

Nitrate/nitrite - H₂SO₄ to pH<2, cool to 4°C

Organic Carbon - 500 mL amber glass bottle/HCl or H₂SO₄ to pH<2, cool to 4°C

Sulfide - 50 mL polyethylene/ZnAcetate + NaOH to pH>9, cool to 4°C

Phenolics - H₂SO₄ to pH<2, cool to 4°C

Specific conductance, TDS, TSS - 100 mL polyethylene/cool to 4°C

ACTION: If no, inform senior chemist. Document justification for change in container/volume (if applicable), qualify positive and non-detect data (J) data if cooler temperature exceeds 10°C. Rejection of data requires professional judgment

Yes ☒ No ☐ N/A ☐ Comments:

1.5.2 Were all samples delivered to the laboratory without breakage?

Yes ☐ No ☒ N/A ☐ Comments:

1.5.3 Does the Cooler Receipt Form or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data?

Yes ☐ No ☒ N/A ☐ Comments:

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1.6 Sample Results Section: Was the following information supplied in the laboratory report for each sample?

<input checked="" type="checkbox"/> Field ID and Lab ID	<input checked="" type="checkbox"/> Date and time collected	<input checked="" type="checkbox"/> Analyst Initials	<input checked="" type="checkbox"/> Dilution Factor	<input checked="" type="checkbox"/> % moisture or solids	<input checked="" type="checkbox"/> Reporting limits
<input checked="" type="checkbox"/> Clean-up method	<input checked="" type="checkbox"/> Analysis method	<input checked="" type="checkbox"/> Preparation method	<input checked="" type="checkbox"/> Date of preparation/extraction/digestion clean-up and analysis, where applicable		
<input checked="" type="checkbox"/> Matrix	<input checked="" type="checkbox"/> Target analytes and concentrations		<input checked="" type="checkbox"/> Units (soils must be reported in dry weight)		

ACTION: If no, contact lab for submission of missing or incomplete information.

1.7 QA/QC Information: Was the following information provided in the laboratory report for each sample batch?

<input checked="" type="checkbox"/> Method blank results	<input checked="" type="checkbox"/> LCS recoveries	<input checked="" type="checkbox"/> MS/MSD recoveries and RPDs	<input checked="" type="checkbox"/> Laboratory duplicate results (where applicable)
--	--	--	---

ACTION: If no, contact lab for submission of missing or incomplete information.

2.0 Holding Times

Have any technical holding times, determined from date of collection to date of analysis, been exceeded? The holding times are as follows:

✓ 28 days = ammonia, chemical oxygen demand, chloride, organic carbon, oil & grease, specific conductance, total organic carbon and sulfate		
Alkalinity = 14 days	Sulfide, TDS, TSS = 7 days	pH = analyze immediately
Nitrite nitrogen as N = 48 hrs	Nitrate + Nitrite as N = 28 days	Nitrate nitrogen as N = 48 hrs

NOTE: List samples that exceed hold time with # of days exceeded on checklist

ACTION: If technical holding times are exceeded qualify results (J). For water samples that are grossly exceeded (>2X hold time) reject (R) all non-detect results. Professional judgment used to qualify soils.

3.0 Laboratory Method

Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>	Comments:
---	-----------------------------	------------------------------	-----------

3.1 Was the correct laboratory method used?

ACTION: If no, contact lab to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change or to request variance.

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3.2 Are the practical quantitation limits the same as those specified by the ☒ QAPP/IRSWP ☐ Lab?

Yes ☐ No ☒ N/A ☐ Comments: The laboratory reporting limit for specific conductivity (umhos/cm) is lower than the specified limit of 3 umhos/cm. No further action required.

Note: The MADEP QA/QC Guidelines do not yet list PQLs for wet chemistry analyses, therefore all criteria will default to values stipulated in the QAPP. Where the QAPP does not define criteria, QA/QC requirements default to limits employed by the lab. Other criteria may also apply.

Ammonia* <input checked="" type="checkbox"/> = 0.1 mg/L	Alkalinity** <input type="checkbox"/> = 1 mg/L	Bicarbonate Alkalinity** <input type="checkbox"/> = 1 mg/L	Carbonate Alkalinity** <input type="checkbox"/> = 1 mg/L
Nitrate Nitrogen as N* <input type="checkbox"/> = .05 mg/L	Nitrite Nitrogen as N* <input type="checkbox"/> = .01 mg/L	Chloride* <input checked="" type="checkbox"/> = 1 mg/L	Hardness * <input type="checkbox"/> = 2 mg/L
Spec. Cond. ** <input checked="" type="checkbox"/> 3 umhos/cm	Total Organic Carbon** <input type="checkbox"/> = 1 mg/L	Oil & Grease* <input type="checkbox"/> = 5.5 mg/L	Sulfate (EPA 300.0)* <input checked="" type="checkbox"/> = 2 mg/L
COD:* Low - 20 mg/L	COD* High - 50 mg/L <input type="checkbox"/>	TDS* <input type="checkbox"/> = 10 mg/L	TSS* <input type="checkbox"/> = 5 mg/L
pH* <input type="checkbox"/> < 2 to > 12	Phenolic - 0.01 mg/L		
Other parameter(list) _____	PQL = _____	<input type="checkbox"/> Source of PQL = _____	
Other parameter(list) _____	PQL = _____	<input type="checkbox"/> Source of PQL = _____	

ACTION: If no, evaluate change with respect to sample matrix, preparation, dilution, moisture, etc. If sample PQL is indeterminate, contact lab for explanation.

3.3 Are the appropriate parameter results present for each sample in the SDG?

Yes ☒ No ☐ N/A ☐ Comments:

ACTION: If no, check Request for Analysis to verify if method was ordered and COC to verify that it was sent, and contact lab for resubmission of the missing data

3.4 If dilutions were required, were dilution factors reported?

Yes ☒ No ☐ N/A ☐ Comments:

ACTION: If no, contact the lab for submission.

4.0 Method Blanks

Yes ☒ No ☐ N/A ☐ Comments:

4.1 Are the Method Blank Summaries present?

ACTION: If no, call the laboratory for submission of missing data.

4.2 Was a method blank analyzed for each analysis batch of wet chemistry field samples of 20 or less?

Yes ☒ No ☐ N/A ☐ Comments:

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ACTION: If no, document discrepancy in case narrative and contact lab for justification. Consult senior chemist for action needed.

4.3 Is the method blank less than the PQL? (See Section 3.2 for PQLs). Yes ☒ No ☐ N/A ☐ Comments:

4.4 Do any method blanks have positive results for wet chemistry parameters? Qualify data Yes ☐ No ☒ N/A ☐ Comments:
according to the following:

If the sample concentration is $< 5 \times$ blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is $> 5 \times$ blank value, no qualification is needed.

ACTION: If any blank has positive results, list all the concentrations detected and flagging level (flagging level = $5 \times$ blank value) on the checklist. List all affected samples and their qualifiers.

5.0 Laboratory Control Standards

5.1 Was a laboratory control standard (LCS) run with each analytical batch of 20 samples or less? Yes ☒ No ☐ N/A ☐ Comments:

ACTION: If no, call laboratory for LCS form submittal. If data is not available, use professional judgment to determine qualification actions for data associated with the batch.

5.2 Is a LCS Summary Form present? Yes ☒ No ☐ N/A ☐ Comments:

ACTION: If no, contact lab for resubmission of missing data.

5.3 Is any wet chemistry analyte LCS recovery outside the control limits? Yes ☐ No ☒ N/A ☐ Comments:

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LCS Limits:

Alkalinity** <input type="checkbox"/> = 80-120%	Bicarbonate Alkalinity** <input type="checkbox"/> = 80-120%	Carbonate Alkalinity** <input type="checkbox"/> = 80-120%	Specific Conductivity * <input checked="" type="checkbox"/> = 80-120%
Total Organic Carbon** <input type="checkbox"/> = 80-120%	TDS** <input type="checkbox"/> = 80-120%	Oil & Grease* <input type="checkbox"/> = 80-120%	Ammonia Nitrogen as N* <input checked="" type="checkbox"/> = 80-120%
COD Low* <input type="checkbox"/> = 80-120%	COD High* <input type="checkbox"/> = 80-120%	Nitrate Nitrogen as N** <input type="checkbox"/> = 80-120%	Nitrite Nitrogen as N** <input type="checkbox"/> = 80-120%
Hardness* <input type="checkbox"/> = 80-120%	Chloride* <input checked="" type="checkbox"/> = 80-120%	Sulfate (EPA 300.0)* <input checked="" type="checkbox"/> = 80-120%	pH* <input type="checkbox"/> = 98-102% TSS* NA

Other parameter(list) _____ %R = _____	<input type="checkbox"/> Rec Limits = _____
Other parameter(list) _____ %R = _____	<input type="checkbox"/> Rec Limits = _____

(MADEP has not yet defined LCS recovery limits for wet chemistry analyses.)

ACTION: If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit, qualify all positive and no-detect results within the batch as (J). If LCS recovery is <10%, non-detect results are rejected (R).

6.0 Matrix Spikes

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

6.1 Were project-specific MS/MSDs analyzed? List project samples that were spiked.

ACTION: If no, contact senior chemist to see if any were specified.

6.2 Is the MS/MSD Recovery Form present?

ACTION: If no, contact lab for resubmission of missing data.

6.3 Were matrix spikes analyzed at the required frequency of 1 per 20 samples per matrix?

ACTION: If any matrix spike data is missing, call lab for resubmission.

6.4 Are any wet chemistry analyte spike recoveries outside of the QC limits?

The chloride MS/MSD percent recoveries (70 and 66) are less than the lower QC limit of 75. Results for chloride were quantified estimated (53) and are considered potentially biased low. The ammonia MS/MSD percent recoveries (1 and 86) are less than the lower QC limit of 75. The unspiked sample concentration is greater than four times the spiking concentration. No further action required.

Yes ☒ No ☐ N/A ☐ Comments: The laboratory performed a chloride and sulfate MS/MSD analysis on sample OC-GW-2020 and an ammonia MS/MSD analysis on sample OC-PZ-15R.

Yes ☒ No ☐ N/A ☐ Comments:

Yes ☒ No ☐ N/A ☐ Comments: The lower QC limit of 75. Results for chloride were

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NOTE: %R = $\frac{(SSR-SR)}{SA}$ x 100% SA = Spike added

Where: SSR = Spiked sample result
SR = Sample result

MS/MSD Recovery Limits:

Alkalinity* = NA	Bicarbonate Alkalinity* = NA	Carbonate alkalinity* = NA	Ammonia* (LACHAT) <input checked="" type="checkbox"/> = 75-125%
Chloride*(SM 4500 Cl) <input checked="" type="checkbox"/> = 75-125%	Specific Conductivity * = NA	Total Organic Carbon* = NA	TDS** = NA
Oil & Grease* = NA	COD Low* <input type="checkbox"/> = 75-125%	COD High* <input type="checkbox"/> = 75-125%	Nitrate Nitrogen as N** <input type="checkbox"/> = 75-125%
Nitrite Nitrogen as N** <input type="checkbox"/> = 75-125%	Hardness* <input type="checkbox"/> = 75-125%	Sulfate (EPA 300.0)* <input checked="" type="checkbox"/> = 75-125%	pH* = NA TSS* = NA
Other parameter(list) _____	% R = _____	<input type="checkbox"/> Rec Limits = _____	

* = Laboratory Limits

** = Olin QAPP Limits (MADEP has not yet defined LCS recovery limits for wet chemistry analyses.)

NOTES: 1) If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags.
2) If the MS/MSD was performed by the laboratory on a non-project sample, no qualification is required.

ACTION: MS/MSD flags only apply to the sample spiked. Do not evaluate if sample concentration is $> 4X$ spike. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit but $> 30\%$, qualify both positive results and non-detects (J). If the MS/MSD recovery is $< 30\%$ and the sample is non-detect, the results are considered unusable and flagged (R).

ACTION: Laboratory control limits apply when spiked sample results fall within the normal calibration range. If dilutions are required due to high sample concentrations, the data is evaluated, but no flags are applied.

6.5 Are any RPDs for MS/MSD recoveries outside of the QA/QC limits?

NOTE: $RPD = S - D$ x 100% Where S = MS result

D = MSD result

Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>	Comments:
			The ammonia

No 11

N/A[]

Comments:

monica

MS/MSD RPD Limits:

RPD ≤ 20

7.0 Laboratory Duplicate

Are the RPDs for the laboratory duplicates <20% unless otherwise specified below?

Comments:	Yes <input checked="" type="checkbox"/>	No <input type="checkbox"/>	N/A <input type="checkbox"/>

No [

N/A []

Comments:

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ACTION: If the RPD is greater than specified limits, qualify all results for that analyte as estimated (J).

pH* ☐ = 3% Specific Conductivity * ☒ = 5% TSS** ☐ = 6% TDS** ☐ = 6%

8.0 Sampling Accuracy

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected.

8.1 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist. Yes ☐ No ☒ N/A ☐ Comments:

8.2 Do any rinsate blanks have positive results? Yes ☐ No ☐ N/A ☒ Comments:

ACTION: Evaluate rinsate results vs. blank results to determine if contaminant may be laboratory-derived. If not lab-related, qualify according to the table below.
 If the sample concentration is $< 5 \times$ blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is $> 5 \times$ blank value, no qualification is needed.

NOTE: MADEP does not require the collection of rinsate blanks.

9.0 Field Duplicates

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates. Yes ☐ No ☒ N/A ☐ Comments:

9.2 Were field duplicates collected per the required frequency? Yes ☐ No ☐ N/A ☒ Comments:

QAPP/IRSWP ☐ MADEP Option 1(1 per 20) ☐ MADEP Option 3 (1 per 10) ☐

9.3 Was the RPD $\leq 30\%$ for waters $\leq 50\%$ for soils? Calculate the RPD for results and attach to this review. Yes ☐ No ☐ N/A ☒ Comments:

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LEVEL I DATA QUALITY EVALUATION
STANDARD OPERATING PROCEDURE AND CHECKLIST
WET CHEMISTRY PARAMETERS BY VARIOUS METHODS

ACTION:. Qualify data (J) for both sample results if the RPD exceeded.

Was any of the data qualified?

Yes ☒ No ☐ N/A ☐ Comments:

If so, apply data qualifiers directly to the DQE copy of laboratory report and **flag pages** for entry in database.

REFERENCES:-

MACTEC, 2007. "Draft Interim Response Steps Work Plan"; Olin Chemical Superfund Site, 51 Eames Street, Wilmington, Massachusetts.; Project No. 6300-06-0010/41.1; July 25, 2007.

Massachusetts Department of Environmental Protection (MADEP), 2004. "The Compendium of Quality Assurance and Quality Control Requirements and Performance Standards for Selected Analytical Methods Used in Support of Response Actions for the Massachusetts Contingency Plan (MCP)"; Bureau of Waste Site Cleanup; 1 Winter Street, Boston, Massachusetts 02108; WSC-CAM; May 2004.

OLIN-WILMINGTON
LEVEL I DATA QUALITY EVALUATION
STANDARD OPERATING PROCEDURE AND CHECKLIST
ICP METALS BY METHOD 6010B/200.7

Reviewer/Date Chris Ricard 5/10/09
 Sr. Review/Date Chris Ricard 5/27/09
 Lab Report # 360-21330-1
 Project # 6107090016.12

1.0 Laboratory Deliverable Requirements

1.1 Laboratory Information: Was all of the following provided in the laboratory report? Yes ☒ No ☐ N/A ☐ Comments:

☒ Name of Laboratory ☒ Address ☒ Project ID ☒ Phone # ☒ Sample identification – Field and Laboratory
 Client Information: ☒ Name ☒ Address ☒ Client Contact (IDs must be cross-referenced)

ACTION: If no, contact lab for submission of missing or illegible information.

1.2 Laboratory Report Certification Statement

Yes ☒ No ☐ N/A ☐ Comments:

Does the laboratory report include a completed Analytical Report Certification in the required format?

ACTION: If no, contact lab for submission of missing certification or certification with correct format.

1.3 Laboratory Case Narrative:

Yes ☒ No ☐ N/A ☐ Comments:

☒ Narrative serves as an exception report for the project and method QA/QC performance. ☐ Narrative includes an explanation of each discrepancy on the

Certification Statement.

ACTION: If no, contact lab for submission of missing or illegible information.

1.4 Chain of Custody (COC) copy present with all documentation completed Yes ☒ No ☐ N/A ☐ Comments:

NOTE: Olin receives and maintains the original COC.

ACTION: If no, contact lab for submission of copy of completed COC.

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LEVEL I DATA QUALITY EVALUATION - OPTION 1
STANDARD OPERATING PROCEDURE AND CHECKLIST
ICP METALS BY METHOD 6010B/200.7

1.5 Sample Receipt Information (Cooler Receipt Form present?):

Yes ☒ No ☐ N/A ☐ Comments:

Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?

☒ Sample temperature confirmed: must be 1° - 10° C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply).

☒ Container type noted ☒ sample condition observed ☒ pH verified (where applicable) ☒ Field and lab IDs cross referenced

ACTION: If no, contact lab for submission of missing or incomplete documentation.

1.5.1 Were all samples delivered to the laboratory without breakage? Yes ☒ No ☐ N/A ☐ Comments:

1.5.2 Does the Cooler Receipt Form or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data? Yes ☐ No ☒ N/A ☐ Comments:

1.6 Sample Results Section: Was each of the following requirements supplied in the laboratory report for each sample? Yes ☒ No ☐ N/A ☐ Comments:

☒ Field ID and Lab ID ☒ Date and time collected ☒ Analyst Initials ☒ Dilution Factor ☒ % moisture or solids ☒ Reporting limits
☒ Clean-up method ☒ Analysis method ☒ Preparation method ☒ Date of preparation/extraction/digestion clean-up and analysis, where applicable
☒ Matrix ☒ Target analytes and concentrations ☒ Units (soils must be reported in dry weight)

ACTION: If no, contact lab for submission of missing or incomplete information.

1.7 QA/QC Information: Was each of the following information supplied in the laboratory report for each sample batch? Yes ☒ No ☐ N/A ☐ Comments:

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LEVEL I DATA QUALITY EVALUATION – OPTION 1
STANDARD OPERATING PROCEDURE AND CHECKLIST
ICP METALS BY METHOD 6010B/200.7

☒ Method blank results ☒ LCS recoveries ☒ MS/MSD recoveries and RPDs ☒ Laboratory duplicate results (where applicable)

ACTION: If no, contact lab for submission of missing or incomplete information.

2.0 Holding Times

Have any technical holding times, determined from date of collection to date of analysis, been exceeded? Holding time for metals is 180 days from sample collection to analysis for both water and soil. Yes ☐ No ☒ N/A ☐ Comments:

NOTE: List samples that exceed hold time with # of days exceeded on checklist

ACTION: If technical holding times are exceeded, qualify all positive results (J) and non-detects (UJ). If grossly exceeded (2X holding time) reject (R) all non-detect results.

3.0 Laboratory Method

3.1 Was the correct laboratory method used? Yes ☒ No ☐ N/A ☐ Comments:

Water Digestion 3005A or 3010A or 3020A
Soil Digestion 3050B
Metals 6010B or 200.7

ACTION: If no, contact laboratory to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change and to request variance.

3.2 Are the practical quantitation limits the same as those specified by the Yes ☒ No ☐ N/A ☐ Comments:
☐ SOW ☒ QAPP ☐ Lab ☐ MADEP

NOTE: Verify that the reported metals match the target list specified on the COC.

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LEVEL I DATA QUALITY EVALUATION - OPTION 1
STANDARD OPERATING PROCEDURE AND CHECKLIST
ICP METALS BY METHOD 6010B/200.7

ACTION: If no, evaluate variation with respect to sample matrix, preparation, dilution, moisture, etc. If sample PQL is indeterminate, contact lab for explanation.

3.3 Are results present for each sample in the SDG? Yes ☒ No ☐ N/A ☐ Comments:

ACTION: If no, check Request for Analysis to verify if method was ordered and COC to verify that it was sent, and contact lab for resubmission of the missing data

3.4 If dilutions were required, were dilution factors reported? Yes ☒ No ☐ N/A ☐ Comments:

ACTION: If no, contact the lab for submission.

4.0 Method Blanks

4.1 Is the Method Blank Summary present? Yes ☒ No ☐ N/A ☐ Comments:

ACTION: If no, call the laboratory for submission of missing data.

4.2 Frequency of Analysis: Was a method blank analyzed for each digestion batch of < 20 field samples? Yes ☒ No ☐ N/A ☐ Comments:

ACTION: If no, contact laboratory for justification. Consult senior chemist for action needed. Narrate non-compliance.

4.3 Is the method blank less than the PQLs for all target elements? Yes ☐ No ☒ N/A ☐ Comments:

NOTE: MADEP requires the method blank to be matrix matched and digested with the samples

4.4 Do any method blanks have positive results for metals? Qualify data according to the following:

Yes ☒ No ☐ N/A ☐ Comments: Aluminum is reported in the dissolved method blank (6.1ug/L). An action limit was established at 5x the blank concentration for dissolved aluminum (30.5ug/L). The result for dissolved aluminum in sample 4 of 10 OC-GW-25 is less than the action limit and was qualified non-detect (ND) at the reporting limit.

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ICP METALS BY METHOD 6010B/200.7

If the sample concentration is $< 5 \times$ blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is $> 5 \times$ blank value, no qualification is needed.

ACTION: For any blank with positive results, list all contaminants for each method blank including the concentration detected and the flagging level (flagging level = $5 \times$ the blank value) and the associated samples and qualifiers.

5.0 Laboratory Control Standard

5.1 Was a laboratory control standard run with each analytical batch of 20 samples or less? Yes ☒ No ☐ N/A ☐ Comments:

NOTE: A full target, second source LCS is required by MADEP.

ACTION: Call laboratory for LCS form submittal. If data are not available, use professional judgement to evaluate data accuracy associated with that batch.

5.2 Is a LCS Summary Form present? Yes ☒ No ☐ N/A ☐ Comments:

ACTION: If no, contact lab for resubmission of missing data.

5.3 Is the recovery of any analyte outside of MADEP control limits? Yes ☐ No ☒ N/A ☐ Comments:

MADEP
Sample Type % Rec
Water 80-120

Soil within Lab generated limits

ACTION: If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit, qualify all positive and non-detects results within the batch as (J). If LCS recovery is $< 30\%$, positive and non-detect results are rejected (R).

Comments:

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LEVEL I DATA QUALITY EVALUATION – OPTION 1
STANDARD OPERATING PROCEDURE AND CHECKLIST
ICP METALS BY METHOD 6010B/200.7

6.0 Matrix Spikes

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

6.1 Were project-specific MS/MSDs collected? List project samples that were spiked. Yes ☐ No ☒ N/A ☐ Comments:

ACTION: If no, contact senior chemist to see if any were specified.

6.2 Is the Matrix Spike/Matrix Spike Duplicate Recovery Form present? Yes ☐ No ☐ N/A ☒ Comments:

NOTE: A *full target*, second source *MS/MSD* is required by *MADEP*.

ACTION: If any matrix spike data are missing, call lab for resubmission.

6.3 Were matrix spikes analyzed as indicated on the COC and project schedule? Yes ☐ No ☐ N/A ☒ Comments:

ACTION: If any matrix spike data are missing, call lab for resubmission. If none, no qualification is needed. Narrate non-compliance.

6.4 Are any metal spike recoveries outside of the QC limits? Yes ☐ No ☐ N/A ☒ Comments:

Sample Type	MADEP % Rec	QAPP % Rec	Method
Water	75-125	N/A	6010B
Water	N/A	70-130	200.7
Soil	75-125	75-125	6010B

NOTE: $\%R = \frac{(SSR-SR)}{SA} \times 100\%$ Where: SSR = Spiked sample result
 SA = Sample result

SA = Spike added

NOTE: If dilutions are required due to high sample concentrations (> 4X spike), the data are evaluated, but no flags are applied.

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LEVEL I DATA QUALITY EVALUATION – OPTION 1
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NOTE: If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags.

ACTION: MS/MSD flags only apply to the sample spiked. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit, qualify positive results and non-detects (J).

6.5 Are any RPDs for MS/MSD recoveries outside of the QC limits? Yes ☐ No ☐ N/A ☒ Comments:

NOTE: $RPD = \frac{S-D}{(S+D)/2} \times 100\%$ Where: S = MS sample result
D = MSD sample result

NOTE: If dilutions are required due to high sample concentrations, the data are evaluated, but no flags are applied.

ACTION: If the RPD exceeds the control limit, qualify positive results and non-detects (J).

7.0 Laboratory Duplicate

7.1 Was a laboratory duplicate sample analyzed? If so, is the Laboratory Duplicate Sample Form present? Yes ☐ No ☒ N/A ☐ Comments:

NOTE: MADEP refers to this sample as a "matrix duplicate".

ACTION: If not analyzed, qualification is not needed. If data is missing, contact laboratory for resubmission of report. Narrate non-compliance.

7.2 Is the RPD between the result for the laboratory duplicate sample and the result for the parent sample outside of the QA/QC limits? Yes ☐ No ☐ N/A ☒ Comments:

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LEVEL I DATA QUALITY EVALUATION – OPTION 1
STANDARD OPERATING PROCEDURE AND CHECKLIST
ICP METALS BY METHOD 6010B/200.7

MADEP Laboratory Duplicate Sample RPD Criteria:

	<u>QAPP RPD</u>
For aqueous results > 5× RL, RPD must be ± 20%	20
For aqueous results < 5× RL, RPD must be ≤ RL	20
For soil/sediment results > 5× RL, RPD must be ± 35%	20
For soil/sediment results < 5× RL, RPD must be ≤ 2× RL	20

ACTION: If the RPD exceeds the limits, qualify both positive results and non-detects as estimated and flag them J. Narrate non-compliance

8.0 Sampling Accuracy

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected.

8.1 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist. Yes ☒ No ☐ N/A ☐ Comments:

8.2 Do any rinsate blanks have positive results? Yes ☐ No ☐ N/A ☒ Comments:

NOTE: MADEP does not require the collection of rinsate blanks.

ACTION: Evaluate rinsate results against blank results to determine if contaminant may be laboratory-derived. If results are not lab-related, qualify according to below.

If the sample concentration is < 5 × blank value, flag sample result non-detect “U” at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

9.0 Field Duplicates

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates. Yes ☒ No ☐ N/A ☐ Comments:

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LEVEL I DATA QUALITY EVALUATION - OPTION 1
STANDARD OPERATING PROCEDURE AND CHECKLIST
ICP METALS BY METHOD 6010B/200.7

9.2 Were field duplicates collected per the required frequency?

Yes ☐ No ☐ N/A ☒ Comments:

SOW ☐ QAPP (1 per 10) ☐ MADEP Option 1 (1 per 20) ☐ MADEP Option 3 (1 per 10) ☐

9.3 Was the RPD $\leq 50\%$ for soils or waters? Calculate the RPD for all results and attach to this review. Yes ☐ No ☐ N/A ☒ Comments:

ACTION: RPD must be $\leq 50\%$ for soil and water. Qualify data (J) for both sample results if the RPD exceeds 50%.

10.0 Special QA/QC

10.1 Were both total and dissolved metals analysis performed? If so, the dissolved metal concentration should not exceed that of the total metal. Yes ☐ No ☒ N/A ☐ Comments:

Dissolved metals results are less than or within 10% greater than the total metals results.

ACTION: If results for both total and dissolved are $\geq 5x$ the PQL and the dissolved concentration is 10% higher than the total, flag both results as estimated (J). If total and dissolved concentrations are less than 5x the PQL and the difference exceeds 2x the PQL, flag both results as estimated (J)

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LEVEL I DATA QUALITY EVALUATION - OPTION 1
STANDARD OPERATING PROCEDURE AND CHECKLIST
ICP METALS BY METHOD 6010B/200.7

10.0 Application of Validation Qualifiers

Was any of the data qualified?

Yes ☒ No ☐ N/A ☐ Comments:

If so, apply data qualifiers directly to the DQE copy of laboratory report and flag pages for entry in database.

REFERENCES

- LAW, 1999, "Final Quality Assurance Project Plan, Olin Wilmington Property, 51 Eames Street, Wilmington, MA", LAW Engineering and Environmental Services, Kennesaw, GA 30144. August 1999
- U.S. Environmental Protection Agency (USEPA), 1989. "Region 1 Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses"; Hazardous Site Evaluation Division; February 1989.
- MADEP, 2001. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Massachusetts Quality Assurance and Quality Control (QA/QC) Requirements." BWSC-CAM, Interim Final Draft, Revision No. 2, 5 October 2001.
- MADEP, 2001. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Quality Assurance and Quality Control Guidelines for Sampling, Data Evaluation and Reporting Activities," BWSC-CAM, Section VII, Public Comment Draft, Revision No. 0, 21 December 2001.

OLIN-WILMINGTON
LEVEL I DATA QUALITY EVALUATION
STANDARD OPERATING PROCEDURE AND CHECKLIST
ICP METALS BY METHOD 6010B/200.7

Reviewer/Date *Chris Ricard* *5/27/09*
 Sr. Review/Date *Chris Ricard* *5/27/09*
 Lab Report # *360-21354-1*
 Project # *61070900612*

1.0 Laboratory Deliverable Requirements

1.1 Laboratory Information: Was all of the following provided in the laboratory report? Yes ☒ No ☐ N/A ☐ Comments:

☒ Name of Laboratory☒ Address☒ Project ID☒ Phone #☒ Sample identification – Field and LaboratoryClient Information: ☒ Name☒ Address☒ Client Contact

(IDs must be cross-referenced)

ACTION: If no, contact lab for submission of missing or illegible information.**1.2 Laboratory Report Certification Statement**Yes ☒ No ☐ N/A ☐ Comments:

Does the laboratory report include a completed Analytical Report Certification in the required format?

ACTION: If no, contact lab for submission of missing certification or certification with correct format.**1.3 Laboratory Case Narrative:**Yes ☒ No ☐ N/A ☐ Comments:☒ Narrative serves as an exception report for the project and method QA/QC performance. ☐ Narrative includes an explanation of each discrepancy on the

Certification Statement.

ACTION: If no, contact lab for submission of missing or illegible information.**1.4 Chain of Custody (COC)** copy present with all documentation completedYes ☒ No ☐ N/A ☐ Comments:**NOTE:** Olin receives and maintains the original COC.**ACTION:** If no, contact lab for submission of copy of completed COC.

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LEVEL I DATA QUALITY EVALUATION - OPTION 1
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1.5 Sample Receipt Information (Cooler Receipt Form present?):

Yes ☒ No ☐ N/A ☐ Comments:

Were each of the following tasks completed and recorded upon receipt of the sample(s) into the laboratory?

☒ Sample temperature confirmed: must be 1° - 10° C. (If samples were sent by courier and delivered on the same day as collection, temperature requirement does not apply).

☒ Container type noted ☒ sample condition observed ☒ pH verified (where applicable) ☒ Field and lab IDs cross referenced

ACTION: If no, contact lab for submission of missing or incomplete documentation.

1.5.1 Were all samples delivered to the laboratory without breakage?

Yes ☒ No ☐ N/A ☐ Comments:

1.5.2 Does the Cooler Receipt Form or Lab Narrative indicate other problems with sample receipt, condition of the samples, analytical problems or special circumstances affecting the quality of the data?

Yes ☐ No ☒ N/A ☐ Comments:

1.6 Sample Results Section: Was each of the following requirements supplied in the laboratory report for each sample?

Yes ☒ No ☐ N/A ☐ Comments:

☒ Field ID and Lab ID
☒ Clean-up method
☒ Matrix

☒ Date and time collected
☐ Analysis method
☒ Target analytes and concentrations

☒ Analyst Initials
☐ Preparation method

☒ Dilution Factor

☒ % moisture or solids

☒ Date of preparation/extraction/digestion clean-up and analysis, where applicable
☒ Units (soils must be reported in dry weight)

☒ Reporting limits

ACTION: If no, contact lab for submission of missing or incomplete information.

1.7 QA/QC Information: Was each of the following information supplied in the laboratory report for each sample batch?

Yes ☒ No ☐ N/A ☐ Comments:

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ICP METALS BY METHOD 6010B/200.7

☒ Method blank results ☒ LCS recoveries ☐ MS/MSD recoveries and RPDs ☒ Laboratory duplicate results (where applicable)

ACTION: If no, contact lab for submission of missing or incomplete information.

2.0 Holding Times

Have any technical holding times, determined from date of collection to date of analysis, been exceeded? Holding time for metals is 180 days from sample collection to analysis for both water and soil. Yes ☐ No ☒ N/A ☐ Comments:

NOTE: List samples that exceed hold time with # of days exceeded on checklist

ACTION: If technical holding times are exceeded, qualify all positive results (J) and non-detects (UJ). If grossly exceeded (2X holding time) reject (R) all non-detect results.

3.0 Laboratory Method

3.1 Was the correct laboratory method used? Yes ☒ No ☐ N/A ☐ Comments:

Water Digestion 3005A or 3010A or 3020A
Soil Digestion 3050B
Metals 6010B or 200.7

ACTION: If no, contact laboratory to provide justification for method change compared to the requested method. Contact senior chemist to inform Client of change and to request variance.

3.2 Are the practical quantitation limits the same as those specified by the Yes ☒ No ☐ N/A ☐ Comments:
☐ SOW ☒ QAPP ☐ Lab ☐ MADEP

NOTE: Verify that the reported metals match the target list specified on the COC.

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LEVEL I DATA QUALITY EVALUATION - OPTION I
STANDARD OPERATING PROCEDURE AND CHECKLIST
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ACTION: If no, evaluate variation with respect to sample matrix, preparation, dilution, moisture, etc. If sample PQL is indeterminate, contact lab for explanation.

3.3 Are results present for each sample in the SDG? Yes ☒ No ☐ N/A ☐ Comments:

ACTION: If no, check Request for Analysis to verify if method was ordered and COC to verify that it was sent, and contact lab for resubmission of the missing data

3.4 If dilutions were required, were dilution factors reported? Yes ☒ No ☐ N/A ☐ Comments:

ACTION: If no, contact the lab for submission.

4.0 Method Blanks

4.1 Is the Method Blank Summary present? Yes ☒ No ☐ N/A ☐ Comments:

ACTION: If no, call the laboratory for submission of missing data.

4.2 Frequency of Analysis: Was a method blank analyzed for each digestion batch of < 20 field samples? Yes ☒ No ☐ N/A ☐ Comments:

ACTION: If no, contact laboratory for justification. Consult senior chemist for action needed. Narrate non-compliance.

4.3 Is the method blank less than the PQLs for all target elements? Yes ☐ No ☒ N/A ☐ Comments:

NOTE: MADEP requires the method blank to be matrix matched and digested with the samples

4.4 Do any method blanks have positive results for metals? Qualify data according to the following:

Yes ☒ No ☐ N/A ☐ Comments: Dissolved chromium (0.24 ug/L) is reported in the method blank. An action limit was established at 5x the chromium conc. (1.2 ug/L). All dissolved chromium results are greater than the action limit, no further action required.

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If the sample concentration is $< 5 \times$ blank value, flag sample result non-detect "U" at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is $> 5 \times$ blank value, no qualification is needed.

ACTION: For any blank with positive results, list all contaminants for each method blank including the concentration detected and the flagging level (flagging level = $5 \times$ the blank value) and the associated samples and qualifiers.

5.0 Laboratory Control Standard

5.1 Was a laboratory control standard run with each analytical batch of 20 samples or less? Yes ☒ No ☐ N/A ☐ Comments:

NOTE: A full target, second source LCS is required by MADEP.

ACTION: Call laboratory for LCS form submittal. If data are not available, use professional judgement to evaluate data accuracy associated with that batch.

5.2 Is a LCS Summary Form present? Yes ☒ No ☐ N/A ☐ Comments:

ACTION: If no, contact lab for resubmission of missing data.

5.3 Is the recovery of any analyte outside of MADEP control limits? Yes ☐ No ☒ N/A ☐ Comments:

<u>Sample Type</u>	<u>% Rec</u>
Water	80-120
Soil	within Lab generated limits

ACTION: If recovery is above the upper limit, qualify all positive sample results within the batch as (J). If recovery is below the lower limit, qualify all positive and non-detects results within the batch as (J). If LCS recovery is $< 30\%$, positive and non-detect results are rejected (R).

Comments:

OLIN CORPORATION
LEVEL I DATA QUALITY EVALUATION - OPTION 1
STANDARD OPERATING PROCEDURE AND CHECKLIST
ICP METALS BY METHOD 6010B/200.7

6.0 Matrix Spikes

Matrix spikes may be collected at different frequencies based on monthly, quarterly, or task specific schedules. Confirm spike requirements for each set with the senior chemist.

- 6.1** Were project-specific MS/MSDs collected? *analyzed?* List project samples that were spiked. *2/5/12/14*

Yes ☒ No ☐ N/A ☐
 aluminum and chromium
 OC-GW - 2025.
 Comments: The lab performed a ~~matrix~~ analysis on sample 2/5/12/14

ACTION: If no, contact senior chemist to see if any were specified.

- 6.2** Is the Matrix Spike/Matrix Spike Duplicate Recovery Form present?

Yes ☒ No ☐ N/A ☐
 Comments:

NOTE: A full target, second source MS/MSD is required by MADEP.

ACTION: If any matrix spike data are missing, call lab for resubmission.

- 6.3** Were matrix spikes analyzed as indicated on the COC and project schedule?

Yes ☒ No ☐ N/A ☐
 Comments:

ACTION: If any matrix spike data are missing, call lab for resubmission. If none, no qualification is needed. Narrate non-compliance.

- 6.4** Are any metal spike recoveries outside of the QC limits?

Yes ☐ No ☒ N/A ☐
 Comments:

Sample Type	MADEP % Rec	QAPP % Rec	Method
Water	75-125	N/A	6010B
Water	N/A	70-130	200.7
Soil	75-125	75-125	6010B

NOTE: %R = $\frac{(SSR-SR)}{SA} \times 100\%$ Where: SSR = Spiked sample result
 SA = Spike added
 SR = Sample result

NOTE: If dilutions are required due to high sample concentrations (> 4X spike), the data are evaluated, but no flags are applied.

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NOTE: If only one of the recoveries for an MS/MSD pair is outside of the control limits, no qualification is necessary. Use professional judgment for the MS/MSD flags.

ACTION: MS/MSD flags only apply to the sample spiked. If the recoveries of the MS and MSD exceed the upper control limit, qualify positive results as estimated (J). If the recoveries of the MS and MSD are lower than the lower control limit, qualify positive results and non-detects (J).

6.5 Are any RPDs for MS/MSD recoveries outside of the QC limits?

Yes ☐ No ☐ N/A ☒ Comments:

NOTE: $RPD = \frac{S-D}{(S+D)/2} \times 100\%$

Where: S = MS sample result
D = MSD sample result

An MSD analysis was not performed.

NOTE: If dilutions are required due to high sample concentrations, the data are evaluated, but no flags are applied.

ACTION: If the RPD exceeds the control limit, qualify positive results and non-detects (J).

7.0 Laboratory Duplicate

7.1 Was a laboratory duplicate sample analyzed? If so, is the Laboratory Duplicate Sample Form present? Yes ☒ No ☐ N/A ☐ Comments:

NOTE: MADEP refers to this sample as a "matrix duplicate".

ACTION: If not analyzed, qualification is not needed. If data is missing, contact laboratory for resubmission of report. Narrate non-compliance.

7.2 Is the RPD between the result for the laboratory duplicate sample and the result for the parent sample outside of the QA/QC limits? Yes ☐ No ☒ N/A ☐ Comments:

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LEVEL I DATA QUALITY EVALUATION – OPTION 1
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<u>MADEP Laboratory Duplicate Sample RPD Criteria:</u>	<u>QAPP RPD</u>
For aqueous results > 5× RL, RPD must be ± 20%	20
For aqueous results < 5× RL, RPD must be ≤ RL	20
For soil/sediment results > 5× RL, RPD must be ± 35%	20
For soil/sediment results < 5× RL, RPD must be ≤ 2× RL	20

ACTION: If the RPD exceeds the limits, qualify both positive results and non-detects as estimated and flag them J. Narrate non-compliance

8.0 Sampling Accuracy

The majority of ground water samples are collected directly from a tap, process stream, or with dedicated tubing. Rinse blanks will not be collected.

8.1 Were rinsate blanks collected? Prior to evaluating rinsate blanks, obtain a list of the associated samples from the senior chemist.

Yes ☐ No ☒ N/A ☐ Comments:

8.2 Do any rinsate blanks have positive results?

Yes ☐ No ☐ N/A ☒ Comments:

NOTE: MADEP does not require the collection of rinsate blanks.

ACTION: Evaluate rinsate results against blank results to determine if contaminant may be laboratory-derived. If results are not lab-related, qualify according to below.

If the sample concentration is < 5 × blank value, flag sample result non-detect “U” at the PQL or the concentration reported if greater than the PQL.

If the sample concentration is > 5 × blank value, no qualification is needed.

9.0 Field Duplicates

9.1 Were field duplicate samples collected? Obtain a list of samples and their associated field duplicates.

Yes ☐ No ☒ N/A ☐ Comments:

OLIN CORPORATION
LEVEL I DATA QUALITY EVALUATION – OPTION 1
STANDARD OPERATING PROCEDURE AND CHECKLIST
ICP METALS BY METHOD 6010B/200.7

9.2 Were field duplicates collected per the required frequency?

Yes ☐ No ☐ N/A ☒ Comments:

SOW ☐ QAPP (1 per 10) ☐ MADEP Option 1 (1 per 20) ☐ MADEP Option 3 (1 per 10) ☐

9.3 Was the RPD \leq 50% for soils or waters? Calculate the RPD for all results and attach to this review. Yes ☐ No ☐ N/A ☒ Comments:

ACTION: RPD must be \leq 50% for soil and water. Qualify data (J) for both sample results if the RPD exceeds 50%.

10.0 Special QA/QC

10.1 Were both total and dissolved metals analysis performed? If so, the dissolved metal concentration should not exceed that of the total metal. Yes ☐ No ☒ N/A ☐ Comments:

ACTION: If results for both total and dissolved are \geq 5x the PQL and the dissolved concentration is 10% higher than the total, flag both results as estimated (J). If total and dissolved concentrations are less than 5x the PQL and the difference exceeds 2x the PQL, flag both results as estimated (J)

OLIN CORPORATION
LEVEL I DATA QUALITY EVALUATION - OPTION 1
STANDARD OPERATING PROCEDURE AND CHECKLIST
ICP METALS BY METHOD 6010B/200.7

10.0 Application of Validation Qualifiers

Was any of the data qualified?

Yes ☐ No ☒ N/A ☐ Comments:

If so, apply data qualifiers directly to the DQE copy of laboratory report and flag pages for entry in database.

REFERENCES

- LAW, 1999, "Final Quality Assurance Project Plan, Olin Wilmington Property, 51 Eames Street, Wilmington, MA", LAW Engineering and Environmental Services, Kennesaw, GA 30144. August 1999
- U.S. Environmental Protection Agency (USEPA), 1989. "Region 1 Laboratory Data Validation Functional Guidelines For Evaluating Inorganic Analyses"; Hazardous Site Evaluation Division; February 1989.
- MADEP, 2001. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Massachusetts Quality Assurance and Quality Control (QA/QC) Requirements." BWSC-CAM, Interim Final Draft, Revision No. 2, 5 October 2001.
- MADEP, 2001. Massachusetts Department of Environmental Protection Bureau of Waste Site Cleanup, "Quality Assurance and Quality Control Guidelines for Sampling, Data Evaluation and Reporting Activities," BWSC-CAM, Section VII, Public Comment Draft, Revision No. 0, 21 December 2001.

ANALYTICAL REPORT

Job Number: 360-21330-1

Job Description: Slurry Wall/Cap

For:

Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441
Attention: Mr. Steven Morrow

CHECKED FOR COMPLETENESS
OF PARAMETERS ORDERED BY:

Chris Baird

Joseph A. Chimi

Approved for release.
Joe Chimi
Report Production Representative
3/6/09 8:49 AM

Designee for
Becky C Mason
Project Manager II
becky.mason@testamericainc.com
03/06/2009

The test results in this report meet all NELAP requirements for accredited parameters. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced except in full, and with written approval from the laboratory.

TestAmerica Westfield Certifications and Approvals: MADEP MA014, RIDOH57, CTDPH 0494, VT DECWSD, NH DES 2539, NELAP FL E87912 TOX, NELAP NJ MA008 TOX, NELAP NY 10843, NY DOH 10843.

Field sampling is performed under SOPs WE-FLD-001 and WE-FLD-002

TestAmerica Laboratories, Inc.

TestAmerica Westfield Westfield Executive Park, 53 Southampton Road, Westfield, MA 01085

Tel (413) 572-4000 Fax (413) 572-3707 www.testamericainc.com



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MADEP MCP Analytical Method Report Certification Form

Laboratory Name: TestAmerica Westfield	Project #: 360-21330-1																		
Project Location: Slurry Wall/Cap	MADEP RTN ¹ :																		
This form provides certifications for the following data set:[list Laboratory Sample ID Number(s)] 360-21330-(1-8)																			
Sample Matrices:	<div style="display: flex; justify-content: space-between;"> Groundwater Soil/Sediment Drinking Water Other: </div>																		
MCP SW-846 Methods Used	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 25%;">8260B ()</td> <td style="width: 25%;">8151A ()</td> <td style="width: 25%;">8330 ()</td> <td style="width: 25%;">6010B (x)</td> <td style="width: 25%;">7470A/1A ()</td> <td style="width: 25%;">Other ()</td> </tr> <tr> <td>8270C ()</td> <td>8081A ()</td> <td>VPH ()</td> <td>6020 ()</td> <td colspan="2">9014M²/9012 ()</td> </tr> <tr> <td>8082 ()</td> <td>8021B ()</td> <td>EPH ()</td> <td>7000 S³ ()</td> <td>7196A ()</td> <td></td> </tr> </table>	8260B ()	8151A ()	8330 ()	6010B (x)	7470A/1A ()	Other ()	8270C ()	8081A ()	VPH ()	6020 ()	9014M ² /9012 ()		8082 ()	8021B ()	EPH ()	7000 S ³ ()	7196A ()	
	8260B ()	8151A ()	8330 ()	6010B (x)	7470A/1A ()	Other ()													
	8270C ()	8081A ()	VPH ()	6020 ()	9014M ² /9012 ()														
8082 ()	8021B ()	EPH ()	7000 S ³ ()	7196A ()															
As specified in MADEP Compendium of Analytical Methods. (check all that apply)	<div style="border: 1px solid black; padding: 5px;"> 1 List Release Tracking Number (RTN), if known 2 M - SW-846 Method 9014 or MADEP Physiologically Available Cyanide (PAC) Method 3 S - SW-846 Methods 7000 Series List individual method and analyte. </div>																		

An affirmative response to questions A, B, C and D is required for "Presumptive Certainty" status


A	Were all samples received by the laboratory in a condition consistent with that described on the Chain-of-Custody documentation for the data set?	Yes √	No ¹
B	Were all QA/QC procedures required for the specified analytical method(s) included in this report followed, including the requirement to note and discuss in a narrative QC data that did not meet appropriate performance standards or guidelines?	Yes √	No ¹
C	Does the analytical data included in this report meet all the requirements for "Presumptive Certainty", as described in Section 2.0 (a), (b), (c) and (d) of the MADEP document CAM VII A, " Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	Yes √	N/A No ¹
D	VPH and EPH methods only: Was the VPH or EPH Method conducted without significant modifications (see Section 11.3 of respective Methods)?	Yes √	N/A No ¹

A response to questions E and F below is required for "Presumptive Certainty" status

E	Were all QC performance standards and recommendations for the specified methods achieved?	Yes √	No ¹
F	Were results for all analyte-list compounds/elements for the specified method(s) reported?	Yes √	N/A No ¹

¹ All Negative responses must be addressed in an attached Environmental Laboratory case narrative.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature: 

Position: Quality Assurance Manager

Printed Name: Christine Reynolds

Date: 3/6/09 8:38

The certification form has been electronically signed and approved.

CAM VII A, Rev 3.2

April-04



MADEP MA014
NY DOH 10843
RI DOH 57
CT DPH 0494
VT DECWSD

NELAP FL E87912 TOX
NELAP NJ MA008 TOX
NELAP NY 10843
NH DES 253901-A



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WI-QA-037

MADEP MCP Analytical Method Report Certification Form

Laboratory Name: TestAmerica Westfield	Project #: 360-21330-1
Project Location: Slurry Wall/Cap	MADEP RTN ¹ :
This form provides certifications for the following data set:[list Laboratory Sample ID Number(s)] 360-21330-(1-8)	
Sample Matrices:	Groundwater Soil/Sediment Drinking Water Other:
MCP SW-846	8260B () 8151A () 8330 () 6010B () 7470A/1A () Other (x)
Methods Used	8270C () 8081A () VPH () 6020 () 9014M ² /9012 ()
As specified in MADEP	8082 () 8021B () EPH () 7000 S ³ () 7196A ()
Compendium of Analytical Methods. (check all that apply)	1 List Release Tracking Number (RTN), if known 2 M - SW-846 Method 9014 or MADEP Physiologically Available Cyanide (PAC) Method 3 S - SW-846 Methods 7000 Series List individual method and analyte.

An affirmative response to questions A, B, C and D is required for "Presumptive Certainty" status


A	Were all samples received by the laboratory in a condition consistent with that described on the Chain-of-Custody documentation for the data set?	Yes √	No ¹
B	Were all QA/QC procedures required for the specified analytical method(s) included in this report followed, including the requirement to note and discuss in a narrative QC data that did not meet appropriate performance standards or guidelines?	Yes √	No ¹
C	Does the analytical data included in this report meet all the requirements for "Presumptive Certainty", as described in Section 2.0 (a), (b), (c) and (d) of the MADEP document CAM VII A, " Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	Yes N/A √	No ¹
D	VPH and EPH methods only: Was the VPH or EPH Method conducted without significant modifications (see Section 11.3 of respective Methods)?	Yes N/A √	No ¹

A response to questions E and F below is required for "Presumptive Certainty" status

E	Were all QC performance standards and recommendations for the specified methods achieved?	Yes √	No ¹
F	Were results for all analyte-list compounds/elements for the specified method(s) reported?	Yes N/A √	No ¹

¹ All Negative responses must be addressed in an attached Environmental Laboratory case narrative.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature: 

Position: Quality Assurance Manager

Printed Name: Christine Reynolds

Date: 3/6/09 8:38

The certification form has been electronically signed and approved.

CAM VII A, Rev 3.2

April-04



MADEP MA014
NY DOH 10843
RI DOH 57
CT DPH 0494
VT DECWSD

NELAP FL E87912 TOX
NELAP NJ MA008 TOX
NELAP NY 10843
NH DES 253901-A



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Westfield, MA 01085
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WI-QA-037

CASE NARRATIVE

Client: Olin Corporation

Project: Slurry Wall/Cap

Report Number: 360-21330-1

This case narrative is in the form of an exception report, where only the anomalies related to this report, method specific performance and/or QA/QC issues are discussed. If there are no issues to report, this narrative will include a statement that documents that there are no relevant data issues as stipulated in the MCP reporting requirements.

In order to facilitate report review, a separate MCP Analytical Method Report Certification Form is included for each method requested.

It should be noted that samples with elevated Reporting Limits (RLs) as a result of a dilution may not be able to satisfy "MCP program" reporting limits in some cases if the "adjusted" RL is greater than the applicable MCP standards or criterion to which the concentration is being compared. Such increases in the RLs are an unavoidable but acceptable consequence of sample dilution that enables quantification of target analytes which exceed the calibration range.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

The samples were received on 02/24/2009; the samples arrived in good condition, properly preserved and on ice. The temperatures of the coolers at receipt were 4.0 and 5.0°C.

Note: All samples which require thermal preservation are considered acceptable if the arrival temperature is within 2C of the required temperature or method specified range. For samples with a specified temperature of 4C, samples with a temperature ranging from just above freezing temperature of water to 6C shall be acceptable. Samples that are hand delivered immediately following collection may not meet these criteria, however they will be deemed acceptable according to NELAC and MADEP standards, if there is evidence that the chilling process has begun, such as arrival on ice, etc.

MCP regulatory standard criteria were not specified for this report. Therefore, method reporting limits (RLs) were not assessed against any MCP standards as it may pertain to Question "E" on the Presumptive Certainty Certification Form (MADEP reference: WSC-CAM-AN-093008 - WSC-CAM Analytical Notes).

DISSOLVED METALS

Samples 360-21330-1 through 360-21330-8 were analyzed for dissolved metals in accordance with EPA SW846 Method 6010B. The samples were analyzed on 02/25/2009.

All QA/QC procedures required to meet Presumptive Certainty for the specified analytical method were performed as per section B of the MADEP MCP analytical method report Certification form.

All QC performance standards and recommendations, which may affect Data Usability for this specific method, were achieved.

General method information:

At the request of the client, an abbreviated/modified MCP analyte list was reported for this job.

TOTAL METALS

Samples 360-21330-1 through 360-21330-7 were analyzed for total metals in accordance with EPA SW846 Method 6010B. The samples were prepared and analyzed on 02/25/2009.

All QA/QC procedures required to meet Presumptive Certainty for the specified analytical method were performed as per section B of the MADEP MCP analytical method report Certification form.

All QC performance standards and recommendations, which may affect Data Usability for this specific method, were achieved.

General method information:

Aluminum was detected in method blank MB 360-41607/1-A at a level that was above the method detection limit but below the reporting limit. The value should be considered an estimate, and has been flagged "J". If the associated sample reported a result above the MDL and/or RL, the result has been "B" flagged. Refer to the QC report for details.

At the request of the client, an abbreviated/modified MCP analyte list was reported for this job.

The following reported methods not listed in the MADEP Massachusetts Contingency Plan (MCP) Compendium of Analytical Methods (CAM), pursuant to the provisions of 310 CMR 40.0017(2).

ANIONS

Samples 360-21330-1 through 360-21330-8 were analyzed for anions in accordance with EPA Method 300.0. The samples were analyzed on 02/25/2009.

All QC performance standards and recommendations for this specific method were achieved.

Samples 360-21330-1 through 360-21330-8(10X) required dilution prior to analysis. The reporting limits have been adjusted accordingly. Dilutions were due to high target concentration. For some samples, Nitrite is reported at a 10X dilution due to the high Chloride concentration.

AMMONIA

Samples 360-21330-1 through 360-21330-8 were analyzed for ammonia in accordance with LACHAT 107-06-1B. The samples were prepared on 03/03/2009 and analyzed on 03/04/2009.

All QC performance standards and recommendations for this specific method were achieved.

Samples 360-21330-2 through 360-21330-5(5X) and 360-21330-8(10X) required dilution prior to analysis. The reporting limits have been adjusted accordingly. Dilutions were due to high concentration.

SPECIFIC CONDUCTANCE (CONDUCTIVITY)

Samples 360-21330-1 through 360-21330-8 were analyzed for Specific Conductance (Conductivity) in accordance with SM 2510B. The samples were analyzed on 02/25/2009.

All QC performance standards and recommendations for this specific method were achieved.

This case narrative is available in Word format upon request.

METHOD SUMMARY

Client: Olin Corporation

Job Number: 360-21330-1

Description	Lab Location	Method	Preparation Method
Matrix: Water			
Dissolved Metals	TAL WFD	SW846 6010B	
Total Metals	TAL WFD	SW846 6010B	
Sample Filtration, Field	TAL WFD		FIELD_FLTRD
Preparation, Total Metals	TAL WFD		SW846 3010A
Chloride & Sulfate	TAL WFD	40CFR136A 300.0	
Nitrate & Nitrite	TAL WFD	40CFR136A 300.0	
Nitrogen Ammonia	TAL WFD	LACHAT L107-06-1B	
Distillation, Ammonia	TAL WFD		Distill/Ammonia
Conductivity, Specific Conductance	TAL WFD	SM SM 2510B	

Lab References:

TAL WFD = TestAmerica Westfield

Method References:

40CFR136A = "Methods for Organic Chemical Analysis of Municipal Industrial Wastewater", 40CFR, Part 136, Appendix A, October 26, 1984 and subsequent revisions.

LACHAT = LACHAT

SM = "Standard Methods For The Examination Of Water And Wastewater",

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

METHOD / ANALYST SUMMARY

Client: Olin Corporation

Job Number: 360-21330-1

Method	Analyst	Analyst ID
SW846 6010B	Nasiatka, Ellen M	EMN
40CFR136A 300.0	Lalashius, Andrew L	ALL
LACHAT L107-06-1B	Lalashius, Andrew L	ALL
SM SM 2510B	Emerich, Rich W	RWE

SAMPLE SUMMARY

Client: Olin Corporation

Job Number: 360-21330-1

Lab Sample ID	Client Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received
360-21330-1	OC-ISCO-3	Water	02/24/2009 0835	02/24/2009 1620
360-21330-2	OC-ISCO-2	Water	02/24/2009 0900	02/24/2009 1620
360-21330-3	OC-PZ-16RRSW	Water	02/24/2009 0905	02/24/2009 1620
360-21330-4	OC-PZ-17RRSW	Water	02/24/2009 0930	02/24/2009 1620
360-21330-5	OC-SD-17	Water	02/24/2009 0940	02/24/2009 1620
360-21330-6	OC-PZ-18RSW	Water	02/24/2009 0955	02/24/2009 1620
360-21330-7	OC-ISCO-1	Water	02/24/2009 1005	02/24/2009 1620
360-21330-8	OC-GW-25	Ground Water	02/24/2009 1330	02/24/2009 1620

SAMPLE RESULTS

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-21330-1

Client Sample ID: OC-ISCO-3
Lab Sample ID: 360-21330-1

Date Sampled: 02/24/2009 0835
Date Received: 02/24/2009 1620
Client Matrix: Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed:	02/25/2009 1100		
Aluminum	39	J	ug/L	2.2	100	1.0
Chromium	0.38	J	ug/L	0.17	5.0	1.0
Sodium	100000		ug/L	65	2000	1.0
Method: 6010B			Date Analyzed:	02/25/2009 1349		
Prep Method: 3010A			Date Prepared:	02/25/2009 0747		
Aluminum	470	B	ug/L	2.2	100	1.0
Chromium	4.3	J	ug/L	0.17	5.0	1.0
Sodium	91000		ug/L	65	2000	1.0

Handwritten signature 5/12/09

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-21330-1

Client Sample ID: OC-ISCO-3
Lab Sample ID: 360-21330-1

Date Sampled: 02/24/2009 0835
Date Received: 02/24/2009 1620
Client Matrix: Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0					
Sulfate	53	mg/L	2.0	2.0	1.0
Nitrate as N	1.1	mg/L	0.050	0.050	1.0
Method: 300.0					
Chloride	200 3	mg/L	10	10	10
Nitrite as N	ND	mg/L	0.10	0.10	10
Method: L107-06-1B					
Prep Method: Distill/Ammonia					
Ammonia	3.3	mg/L	0.10	0.10	1.0
Method: SM 2510B					
Specific Conductance	820	umhos/cm	1.0	1.0	1.0

pd affected 5/19/09

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-21330-1

Client Sample ID: OC-ISCO-2
Lab Sample ID: 360-21330-2

Date Sampled: 02/24/2009 0900
Date Received: 02/24/2009 1620
Client Matrix: Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B					
			Date Analyzed: 02/25/2009 1102		
Aluminum	800	ug/L	2.2	100	1.0
Chromium	160	ug/L	0.17	5.0	1.0
Sodium	100000	ug/L	65	2000	1.0
Method: 6010B					
Prep Method: 3010A					
			Date Analyzed: 02/25/2009 1353		
			Date Prepared: 02/25/2009 0747		
Aluminum	1300	ug/L	2.2	100	1.0
Chromium	250	ug/L	0.17	5.0	1.0
Sodium	91000	ug/L	65	2000	1.0

Handwritten signature: [Signature] 5/18/09

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-21330-1

Client Sample ID: OC-ISCO-2
Lab Sample ID: 360-21330-2

Date Sampled: 02/24/2009 0900
Date Received: 02/24/2009 1620
Client Matrix: Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0					
		Date Analyzed:	02/25/2009 1810		
Nitrate as N	0.81	mg/L	0.050	0.050	1.0
Nitrite as N	ND	mg/L	0.010	0.010	1.0
Method: 300.0					
		Date Analyzed:	02/25/2009 1825		
Sulfate	210	mg/L	20	20	10
Chloride	120 3	mg/L	10	10	10
Method: L107-06-1B					
		Date Analyzed:	03/04/2009 1733		
Prep Method: Distill/Ammonia		Date Prepared:	03/03/2009 1320		
Ammonia	42	mg/L	0.50	0.50	5.0
Method: SM 2510B					
		Date Analyzed:	02/25/2009 1029		
Specific Conductance	900	umhos/cm	1.0	1.0	1.0

per/10/09 DCL 5/19/09

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-21330-1

Client Sample ID: OC-PZ-16RRSW
Lab Sample ID: 360-21330-3

Date Sampled: 02/24/2009 0905
Date Received: 02/24/2009 1620
Client Matrix: Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B		Date Analyzed: 02/25/2009 1105			
Aluminum	1300	ug/L	2.2	100	1.0
Chromium	340	ug/L	0.17	5.0	1.0
Sodium	120000	ug/L	65	2000	1.0
Method: 6010B		Date Analyzed: 02/25/2009 1356			
Prep Method: 3010A		Date Prepared: 02/25/2009 0747			
Aluminum	3000 B	ug/L	2.2	100	1.0
Chromium	740	ug/L	0.17	5.0	1.0
Sodium	110000	ug/L	65	2000	1.0

not for release 5/18/09

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-21330-1

Client Sample ID: OC-PZ-16RRSW
Lab Sample ID: 360-21330-3

Date Sampled: 02/24/2009 0905
Date Received: 02/24/2009 1620
Client Matrix: Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0 Nitrate as N	0.49	mg/L	0.050	0.050	1.0
Method: 300.0 Sulfate	240	mg/L	20	20	10
Chloride	150	mg/L	10	10	10
Nitrite as N	ND	mg/L	0.10	0.10	10
Method: L107-06-1B Prep Method: Distill/Ammonia Ammonia	41	mg/L	0.50	0.50	5.0
Method: SM 2510B Specific Conductance	1000	umhos/cm	1.0	1.0	1.0

Handwritten signature: J. M. Morrow 5/19/09

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-21330-1

Client Sample ID: OC-PZ-17RRSW
Lab Sample ID: 360-21330-4

Date Sampled: 02/24/2009 0930
Date Received: 02/24/2009 1620
Client Matrix: Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B					
			Date Analyzed:	02/25/2009 1108	
Aluminum	2200	ug/L	2.2	100	1.0
Chromium	440	ug/L	0.17	5.0	1.0
Sodium	110000	ug/L	65	2000	1.0
Method: 6010B					
Prep Method: 3010A					
			Date Analyzed:	02/25/2009 1404	
			Date Prepared:	02/25/2009 0747	
Aluminum	3500	ug/L	2.2	100	1.0
Chromium	880	ug/L	0.17	5.0	1.0
Sodium	120000	ug/L	65	2000	1.0

 5/18/09

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-21330-1

Client Sample ID: OC-PZ-17RRSW
Lab Sample ID: 360-21330-4

Date Sampled: 02/24/2009 0930
Date Received: 02/24/2009 1620
Client Matrix: Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0					
Nitrate as N	0.48	mg/L	0.050	0.050	1.0
Method: 300.0					
Sulfate	240	mg/L	20	20	10
Chloride	140	mg/L	10	10	10
Nitrite as N	ND	mg/L	0.10	0.10	10
Method: L107-06-1B					
Prep Method: Distill/Ammonia					
Ammonia	34	mg/L	0.50	0.50	5.0
Method: SM 2510B					
Specific Conductance	1000	umhos/cm	1.0	1.0	1.0

 5/19/09

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Job Number: 360-21330-1

Client Sample ID: OC-SD-17
Lab Sample ID: 360-21330-5

Date Sampled: 02/24/2009 0940
Date Received: 02/24/2009 1620
Client Matrix: Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed:	02/25/2009 1111	
Aluminum	1500	ug/L	2.2	100	1.0
Chromium	390	ug/L	0.17	5.0	1.0
Sodium	130000	ug/L	65	2000	1.0
Method: 6010B			Date Analyzed:	02/25/2009 1407	
Prep Method: 3010A			Date Prepared:	02/25/2009 0747	
Aluminum	3400	ug/L	2.2	100	1.0
Chromium	870	ug/L	0.17	5.0	1.0
Sodium	120000	ug/L	65	2000	1.0

W. J. P. Olin 5/18/09

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Job Number: 360-21330-1

Client Sample ID: OC-SD-17
Lab Sample ID: 360-21330-5

Date Sampled: 02/24/2009 0940
Date Received: 02/24/2009 1620
Client Matrix: Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0 Nitrate as N	0.45	mg/L	0.050	0.050	1.0
Method: 300.0 Sulfate	240	mg/L	20	20	10
Chloride	160 J	mg/L	10	10	10
Nitrite as N	ND	mg/L	0.10	0.10	10
Method: L107-06-1B Prep Method: Distill/Ammonia					
Ammonia	37	mg/L	0.50	0.50	5.0
Method: SM 2510B Specific Conductance	1100	umhos/cm	1.0	1.0	1.0

W. J. Olin 5/17/09

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Job Number: 360-21330-1

Client Sample ID: OC-PZ-18RSW
Lab Sample ID: 360-21330-6

Date Sampled: 02/24/2009 0955
Date Received: 02/24/2009 1620
Client Matrix: Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed:	02/25/2009 1114	
Aluminum	230	ug/L	2.2	100	1.0
Chromium	36	ug/L	0.17	5.0	1.0
Sodium	100000	ug/L	65	2000	1.0
Method: 6010B			Date Analyzed:	02/25/2009 1410	
Prep Method: 3010A			Date Prepared:	02/25/2009 0747	
Aluminum	370	ug/L	2.2	100	1.0
Chromium	47	ug/L	0.17	5.0	1.0
Sodium	100000	ug/L	65	2000	1.0


5/12/09

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Job Number: 360-21330-1

Client Sample ID: OC-PZ-18RSW
Lab Sample ID: 360-21330-6

Date Sampled: 02/24/2009 0955
Date Received: 02/24/2009 1620
Client Matrix: Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0					
Sulfate	91	mg/L	2.0	2.0	1.0
Nitrate as N	0.41	mg/L	0.050	0.050	1.0
Method: 300.0					
Chloride	150 <i>5</i>	mg/L	10	10	10
Nitrite as N	ND	mg/L	0.10	0.10	10
Method: L107-06-1B					
Prep Method: Distill/Ammonia					
Ammonia	17	mg/L	0.10	0.10	1.0
Method: SM 2510B					
Specific Conductance	740	umhos/cm	1.0	1.0	1.0

Robert D. Clark 5/19/09

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Job Number: 360-21330-1

Client Sample ID: OC-ISCO-1
Lab Sample ID: 360-21330-7

Date Sampled: 02/24/2009 1005
Date Received: 02/24/2009 1620
Client Matrix: Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B					
			Date Analyzed:	02/25/2009 1123	
Aluminum	280	ug/L	2.2	100	1.0
Chromium	40	ug/L	0.17	5.0	1.0
Sodium	98000	ug/L	65	2000	1.0
Method: 6010B					
Prep Method: 3010A					
			Date Analyzed:	02/25/2009 1413	
			Date Prepared:	02/25/2009 0747	
Aluminum	350	ug/L	2.2	100	1.0
Chromium	44	ug/L	0.17	5.0	1.0
Sodium	90000	ug/L	65	2000	1.0

Supp. Clin 5/18/09

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Job Number: 360-21330-1

Client Sample ID: OC-ISCO-1
Lab Sample ID: 360-21330-7

Date Sampled: 02/24/2009 1005
Date Received: 02/24/2009 1620
Client Matrix: Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0					
			Date Analyzed:	02/25/2009 2111	
Sulfate	94	mg/L	2.0	2.0	1.0
Nitrate as N	0.40	mg/L	0.050	0.050	1.0
Method: 300.0					
			Date Analyzed:	02/25/2009 2126	
Chloride	140 J	mg/L	10	10	10
Nitrite as N	ND	mg/L	0.10	0.10	10
Method: L107-06-1B					
Prep Method: Distill/Ammonia			Date Analyzed:	03/04/2009 1726	
Ammonia	18	mg/L	0.10	0.10	1.0
Method: SM 2510B					
Specific Conductance	730	umhos/cm	1.0	1.0	1.0

W. J. D. Olin 5/19/09

Mr. Steven Morrow
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Job Number: 360-21330-1

Client Sample ID: OC-GW-25
Lab Sample ID: 360-21330-8

Date Sampled: 02/24/2009 1330
Date Received: 02/24/2009 1620
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B					
Aluminum	7.4 100 U J	ug/L	2.2	100	1.0
Chromium	4.9 J	ug/L	0.17	5.0	1.0

 5/18/09

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Job Number: 360-21330-1

Client Sample ID: OC-GW-25
Lab Sample ID: 360-21330-8

Date Sampled: 02/24/2009 1330
Date Received: 02/24/2009 1620
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0					
Sulfate	140	mg/L	20	20	10
Chloride	39 J	mg/L	10	10	10
Method: L107-06-1B					
Prep Method: Distill/Ammonia					
Ammonia	43	mg/L	1.0	1.0	10
Method: SM 2510B					
Specific Conductance	650	umhos/cm	1.0	1.0	1.0

Handwritten signature: J. G. O. Clute 5/12/09

DATA REPORTING QUALIFIERS

Client: Olin Corporation

Job Number: 360-21330-1

Lab Section	Qualifier	Description
Metals	B	Compound was found in the blank and sample.
	J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.

QUALITY CONTROL RESULTS

Quality Control Results

Client: Olin Corporation

Job Number: 360-21330-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
Metals					
Prep Batch: 360-41607					
LCS 360-41607/2-A	Lab Control Spike	T	Water	3010A	
LCSD 360-41607/3-A	Lab Control Spike Duplicate	T	Water	3010A	
MB 360-41607/1-A	Method Blank	T	Water	3010A	
360-21330-1	OC-ISCO-3	T	Water	3010A	
360-21330-2	OC-ISCO-2	T	Water	3010A	
360-21330-3	OC-PZ-16RRSW	T	Water	3010A	
360-21330-4	OC-PZ-17RRSW	T	Water	3010A	
360-21330-5	OC-SD-17	T	Water	3010A	
360-21330-6	OC-PZ-18RSW	T	Water	3010A	
360-21330-7	OC-ISCO-1	T	Water	3010A	
Analysis Batch:360-41632					
LCS 360-41632/1	Lab Control Spike	T	Water	6010B	
LCSD 360-41632/13	Lab Control Spike Duplicate	T	Water	6010B	
MB 360-41632/2	Method Blank	T	Water	6010B	
360-21330-1	OC-ISCO-3	D	Water	6010B	
360-21330-2	OC-ISCO-2	D	Water	6010B	
360-21330-3	OC-PZ-16RRSW	D	Water	6010B	
360-21330-4	OC-PZ-17RRSW	D	Water	6010B	
360-21330-5	OC-SD-17	D	Water	6010B	
360-21330-6	OC-PZ-18RSW	D	Water	6010B	
360-21330-7	OC-ISCO-1	D	Water	6010B	
360-21330-8	OC-GW-25	D	Water	6010B	
Analysis Batch:360-41641					
LCS 360-41607/2-A	Lab Control Spike	T	Water	6010B	360-41607
LCSD 360-41607/3-A	Lab Control Spike Duplicate	T	Water	6010B	360-41607
MB 360-41607/1-A	Method Blank	T	Water	6010B	360-41607
360-21330-1	OC-ISCO-3	T	Water	6010B	360-41607
360-21330-2	OC-ISCO-2	T	Water	6010B	360-41607
360-21330-3	OC-PZ-16RRSW	T	Water	6010B	360-41607
360-21330-4	OC-PZ-17RRSW	T	Water	6010B	360-41607
360-21330-5	OC-SD-17	T	Water	6010B	360-41607
360-21330-6	OC-PZ-18RSW	T	Water	6010B	360-41607
360-21330-7	OC-ISCO-1	T	Water	6010B	360-41607

Report Basis

D = Dissolved

T = Total

Quality Control Results

Client: Olin Corporation

Job Number: 360-21330-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
General Chemistry					
Analysis Batch:360-41620					
LCS 360-41620/1	Lab Control Spike	T	Water	SM 2510B	
MB 360-41620/4	Method Blank	T	Water	SM 2510B	
360-21330-1	OC-ISCO-3	T	Water	SM 2510B	
360-21330-2	OC-ISCO-2	T	Water	SM 2510B	
360-21330-3	OC-PZ-16RRSW	T	Water	SM 2510B	
360-21330-4	OC-PZ-17RRSW	T	Water	SM 2510B	
360-21330-5	OC-SD-17	T	Water	SM 2510B	
360-21330-6	OC-PZ-18RSW	T	Water	SM 2510B	
360-21330-7	OC-ISCO-1	T	Water	SM 2510B	
360-21330-8	OC-GW-25	T	Water	SM 2510B	
Analysis Batch:360-41671					
LCS 360-41671/2	Lab Control Spike	T	Water	300.0	
MB 360-41671/1	Method Blank	T	Water	300.0	
360-21330-1	OC-ISCO-3	T	Water	300.0	
360-21330-2	OC-ISCO-2	T	Water	300.0	
360-21330-3	OC-PZ-16RRSW	T	Water	300.0	
360-21330-4	OC-PZ-17RRSW	T	Water	300.0	
360-21330-5	OC-SD-17	T	Water	300.0	
360-21330-6	OC-PZ-18RSW	T	Water	300.0	
360-21330-7	OC-ISCO-1	T	Water	300.0	
Analysis Batch:360-41672					
LCS 360-41672/2	Lab Control Spike	T	Water	300.0	
MB 360-41672/1	Method Blank	T	Water	300.0	
360-21330-1	OC-ISCO-3	T	Water	300.0	
360-21330-2	OC-ISCO-2	T	Water	300.0	
360-21330-3	OC-PZ-16RRSW	T	Water	300.0	
360-21330-4	OC-PZ-17RRSW	T	Water	300.0	
360-21330-5	OC-SD-17	T	Water	300.0	
360-21330-6	OC-PZ-18RSW	T	Water	300.0	
360-21330-7	OC-ISCO-1	T	Water	300.0	
360-21330-8	OC-GW-25	T	Water	300.0	
Prep Batch: 360-41845					
LCS 360-41845/2-A	Lab Control Spike	T	Water	Distill/Ammonia	
MB 360-41845/1-A	Method Blank	T	Water	Distill/Ammonia	
360-21330-1	OC-ISCO-3	T	Water	Distill/Ammonia	
360-21330-2	OC-ISCO-2	T	Water	Distill/Ammonia	
360-21330-3	OC-PZ-16RRSW	T	Water	Distill/Ammonia	
360-21330-4	OC-PZ-17RRSW	T	Water	Distill/Ammonia	
360-21330-5	OC-SD-17	T	Water	Distill/Ammonia	
360-21330-6	OC-PZ-18RSW	T	Water	Distill/Ammonia	
360-21330-7	OC-ISCO-1	T	Water	Distill/Ammonia	
360-21330-8	OC-GW-25	T	Water	Distill/Ammonia	

TestAmerica Westfield

Quality Control Results

Client: Olin Corporation

Job Number: 360-21330-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
General Chemistry					
Analysis Batch:360-41860					
LCS 360-41845/2-A	Lab Control Spike	T	Water	L107-06-1B	360-41845
MB 360-41845/1-A	Method Blank	T	Water	L107-06-1B	360-41845
360-21330-1	OC-ISCO-3	T	Water	L107-06-1B	360-41845
360-21330-2	OC-ISCO-2	T	Water	L107-06-1B	360-41845
360-21330-3	OC-PZ-16RRSW	T	Water	L107-06-1B	360-41845
360-21330-4	OC-PZ-17RRSW	T	Water	L107-06-1B	360-41845
360-21330-5	OC-SD-17	T	Water	L107-06-1B	360-41845
360-21330-6	OC-PZ-18RSW	T	Water	L107-06-1B	360-41845
360-21330-7	OC-ISCO-1	T	Water	L107-06-1B	360-41845
360-21330-8	OC-GW-25	T	Water	L107-06-1B	360-41845

Report Basis

T = Total

Quality Control Results

Client: Olin Corporation

Job Number: 360-21330-1

Method Blank - Batch: 360-41607

Method: 6010B
Preparation: 3010A

Dissolved.

Lab Sample ID: MB 360-41607/1-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 02/25/2009 1303
Date Prepared: 02/25/2009 0747

Analysis Batch: 360-41641
Prep Batch: 360-41607
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume: 50 mL
Final Weight/Volume: 50 mL

Analyte	Result	Qual	MDL	RL
Aluminum	6.1	J	2.2	100
Chromium	ND		0.17	5.0
Sodium	ND		65	2000

Lab Control Spike/

Lab Control Spike Duplicate Recovery Report - Batch: 360-41607

Method: 6010B
Preparation: 3010A

LCS Lab Sample ID: LCS 360-41607/2-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 02/25/2009 1306
Date Prepared: 02/25/2009 0747

Analysis Batch: 360-41641
Prep Batch: 360-41607
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume: 50 mL
Final Weight/Volume: 50 mL

LCSD Lab Sample ID: LCSD 360-41607/3-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 02/25/2009 1309
Date Prepared: 02/25/2009 0747

Analysis Batch: 360-41641
Prep Batch: 360-41607
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume: 50 mL
Final Weight/Volume: 50 mL

Analyte	% Rec.		Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
	LCS	LCSD					
Aluminum	98	101	80 - 120	3	20		
Chromium	99	102	80 - 120	3	20		
Sodium	95	98	80 - 120	3	20		

Calculations are performed before rounding to avoid round-off errors in calculated results.

Quality Control Results

Client: Olin Corporation

Job Number: 360-21330-1

Method Blank - Batch: 360-41632

Method: 6010B
Preparation: N/A

Lab Sample ID: MB 360-41632/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 02/25/2009 1044
Date Prepared: N/A

Analysis Batch: 360-41632
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 1.0 mL

Analyte	Result	Qual	MDL	RL
Aluminum	ND		2.2	100
Chromium	ND		0.17	5.0
Sodium	ND		65	2000

Lab Control Spike/ Lab Control Spike Duplicate Recovery Report - Batch: 360-41632

Method: 6010B
Preparation: N/A

LCS Lab Sample ID: LCS 360-41632/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 02/25/2009 1041
Date Prepared: N/A

Analysis Batch: 360-41632
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 10 mL

LCSD Lab Sample ID: LCSD 360-41632/13
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 02/25/2009 1117
Date Prepared: N/A

Analysis Batch: 360-41632
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 10 mL

Analyte	% Rec.		Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
	LCS	LCSD					
Aluminum	98	98	80 - 120	0	20		
Chromium	98	98	80 - 120	0	20		
Sodium	98	97	80 - 120	1	20		

Calculations are performed before rounding to avoid round-off errors in calculated results.

Quality Control Results

Client: Olin Corporation

Job Number: 360-21330-1

Method Blank - Batch: 360-41671

Method: 300.0
Preparation: N/A

Lab Sample ID: MB 360-41671/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 02/25/2009 1609
Date Prepared: N/A

Analysis Batch: 360-41671
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 1.0 mL

Analyte	Result	Qual	RL	RL
Nitrate as N	ND	✓	0.050	0.050
Nitrite as N	ND	✓	0.010	0.010

Lab Control Spike - Batch: 360-41671

Method: 300.0
Preparation: N/A

Lab Sample ID: LCS 360-41671/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 02/25/2009 1625
Date Prepared: N/A

Analysis Batch: 360-41671
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 1.0 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Nitrate as N	4.00	4.14	103	85 - 115	✓
Nitrite as N	4.00	4.04	101	85 - 115	✓

Calculations are performed before rounding to avoid round-off errors in calculated results.

Quality Control Results

Client: Olin Corporation

Job Number: 360-21330-1

Method Blank - Batch: 360-41672

Method: 300.0
Preparation: N/A

Lab Sample ID: MB 360-41672/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 02/25/2009 1609
Date Prepared: N/A

Analysis Batch: 360-41672
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 1.0 mL

Analyte	Result	Qual	RL	RL
Sulfate	ND		2.0	2.0
Chloride	ND		1.0	1.0

Lab Control Spike - Batch: 360-41672

Method: 300.0
Preparation: N/A

Lab Sample ID: LCS 360-41672/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 02/25/2009 1625
Date Prepared: N/A

Analysis Batch: 360-41672
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 1.0 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Sulfate	80.0	82.2	103	85 - 115	
Chloride	40.0	40.4	101	85 - 115	

Calculations are performed before rounding to avoid round-off errors in calculated results.

Quality Control Results

Client: Olin Corporation

Job Number: 360-21330-1

Method Blank - Batch: 360-41845

Method: L107-06-1B
Preparation: Distill/Ammonia

Lab Sample ID: MB 360-41845/1-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/04/2009 1714
Date Prepared: 03/03/2009 1320

Analysis Batch: 360-41860
Prep Batch: 360-41845
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 50 mL

Analyte	Result	Qual	RL	RL
Ammonia	ND ✓		0.10	0.10

Lab Control Spike - Batch: 360-41845

Method: L107-06-1B
Preparation: Distill/Ammonia

Lab Sample ID: LCS 360-41845/2-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/04/2009 1715
Date Prepared: 03/03/2009 1320

Analysis Batch: 360-41860
Prep Batch: 360-41845
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 50 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Ammonia	10.0	9.44	94 ✓	85 - 115	

Calculations are performed before rounding to avoid round-off errors in calculated results.

Quality Control Results

Client: Olin Corporation

Job Number: 360-21330-1

Method Blank - Batch: 360-41620

Method: SM 2510B

Preparation: N/A

Lab Sample ID: MB 360-41620/4
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 02/25/2009 0956
Date Prepared: N/A

Analysis Batch: 360-41620
Prep Batch: N/A
Units: umhos/cm

Instrument ID: MAN-TECH Ion Plus
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 1.0 mL

Analyte	Result	Qual	RL	RL
Specific Conductance	ND ✓		1.0	1.0

Lab Control Spike - Batch: 360-41620

Method: SM 2510B

Preparation: N/A

Lab Sample ID: LCS 360-41620/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 02/25/2009 0931
Date Prepared: N/A

Analysis Batch: 360-41620
Prep Batch: N/A
Units: umhos/cm

Instrument ID: MAN-TECH Ion Plus
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 1.0 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Specific Conductance	1420	1440	101 ✓	85 - 115	

Calculations are performed before rounding to avoid round-off errors in calculated results.

Login Sample Receipt Check List

Client: Olin Corporation

Job Number: 360-21330-1

Login Number: 21330

List Source: TestAmerica Westfield

Creator: Rinard, Kimberley A

List Number: 1

Question	T / F / NA	Comment
Radioactivity either was not measured or, if measured, is at or below background	N/A	
The cooler's custody seal, if present, is intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	4.0 C / 5.0 C
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	N/A	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	

●53 Southampton Road
 Westfield, MA 01085
 (P) 413-572-4000
 (F) 413-572-3707

White = Lab file Yellow = Report copy Pink = Customer copy
STL-8245 (1000)

ANALYTICAL REPORT

Job Number: 360-21354-1
Job Description: Slurry Wall/Cap

CHECKED FOR COMPLETENESS
OF PARAMETERS ORDERED BY:

Chris Bernard

For:
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441
Attention: Mr. Steven Morrow

Joseph A. Chimi

Approved for release:
Joe Chimi
Report Production Representative
3/11/09 3:13 PM

Designee for
Becky C Mason
Project Manager II
becky.mason@testamericainc.com
03/11/2009

The test results in this report meet all NELAP requirements for accredited parameters. Any exceptions to NELAP requirements are noted in this report. Pursuant to NELAP, this report may not be reproduced except in full, and with written approval from the laboratory.

TestAmerica Westfield Certifications and Approvals: MADEP MA014, RIDOH57, CTDPH 0494, VT DECWSD, NH DES 2539, NELAP FL E87912 TOX, NELAP NJ MA008 TOX, NELAP NY 10843, NY DOH 10843.

Field sampling is performed under SOPs WE-FLD-001 and WE-FLD-002

TestAmerica Laboratories, Inc.

TestAmerica Westfield Westfield Executive Park, 53 Southampton Road, Westfield, MA 01085
Tel (413) 572-4000 Fax (413) 572-3707 www.testamericainc.com



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MADEP MCP Analytical Method Report Certification Form

Laboratory Name: TestAmerica Westfield	Project #: 360-21354-1
Project Location: Slurry Wall/Cap	MADEP RTN ¹ :
This form provides certifications for the following data set:[list Laboratory Sample ID Number(s)] 360-21354-(1-6)	
Sample Matrices:	Groundwater Soil/Sediment Drinking Water Other:
MCP SW-846 Methods Used	8260B () 8151A () 8330 () 6010B (x) 7470A/1A () Other ()
	8270C () 8081A () VPH () 6020 () 9014M ² /9012 ()
	8082 () 8021B () EPH () 7000 S ³ () 7196A ()
As specified in MADEP Compendium of Analytical Methods. (check all that apply)	1 List Release Tracking Number (RTN), if known 2 M - SW-846 Method 9014 or MADEP Physiologically Available Cyanide (PAC) Method 3 S - SW-846 Methods 7000 Series List individual method and analyte.

An affirmative response to questions A, B, C and D is required for "Presumptive Certainty" status

A	Were all samples received by the laboratory in a condition consistent with that described on the Chain-of-Custody documentation for the data set?	Yes √	No ¹
B	Were all QA/QC procedures required for the specified analytical method(s) included in this report followed, including the requirement to note and discuss in a narrative QC data that did not meet appropriate performance standards or guidelines?	Yes √	No ¹
C	Does the analytical data included in this report meet all the requirements for "Presumptive Certainty", as described in Section 2.0 (a), (b), (c) and (d) of the MADEP document CAM VII A, " Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	Yes √	N/A No ¹
D	VPH and EPH methods only: Was the VPH or EPH Method conducted without significant modifications (see Section 11.3 of respective Methods)?	Yes √	N/A No ¹

A response to questions E and F below is required for "Presumptive Certainty" status

E	Were all QC performance standards and recommendations for the specified methods achieved?	Yes √	No ¹
F	Were results for all analyte-list compounds/elements for the specified method(s) reported?	Yes √	N/A No ¹

¹ All Negative responses must be addressed in an attached Environmental Laboratory case narrative.



I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature: 	Position: <u>Quality Assurance Manager</u>
Printed Name: <u>Christine Reynolds</u>	Date: <u>3/11/09 15:03</u>

The certification form has been electronically signed and approved.

CAM VII A, Rev 3.2

April-04

 THE LEADER IN ENVIRONMENTAL TESTING	MADEP MA014 NY DOH 10843 RI DOH 57 CT DPH 0494 VT DECWSD	NELAP FL E87912 TOX NELAP NJ MA008 TOX NELAP NY 10843 NH DES 253901-A 
TestAmerica Westfield 53 Southampton Rd, Westfield, MA 01085 Tel: (413) 572-4000 Fax: (413) 572-3707		

WI-QA-037

MADEP MCP Analytical Method Report Certification Form

Laboratory Name: TestAmerica Westfield	Project #: 360-21354-1																		
Project Location: Slurry Wall/Cap	MADEP RTN ¹ :																		
This form provides certifications for the following data set:[list Laboratory Sample ID Number(s)] 360-21354-(1-6)																			
Sample Matrices:	<div style="display: flex; justify-content: space-between;"> Groundwater Soil/Sediment Drinking Water Other: </div>																		
MCP SW-846 Methods Used	<table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="width: 16.6%;">8260B ()</td> <td style="width: 16.6%;">8151A ()</td> <td style="width: 16.6%;">8330 ()</td> <td style="width: 16.6%;">6010B ()</td> <td style="width: 16.6%;">7470A/1A ()</td> <td style="width: 16.6%;">Other (x)</td> </tr> <tr> <td>8270C ()</td> <td>8081A ()</td> <td>VPH ()</td> <td>6020 ()</td> <td colspan="2">9014M²/9012 ()</td> </tr> <tr> <td>8082 ()</td> <td>8021B ()</td> <td>EPH ()</td> <td>7000 S³ ()</td> <td>7196A ()</td> <td></td> </tr> </table>	8260B ()	8151A ()	8330 ()	6010B ()	7470A/1A ()	Other (x)	8270C ()	8081A ()	VPH ()	6020 ()	9014M ² /9012 ()		8082 ()	8021B ()	EPH ()	7000 S ³ ()	7196A ()	
	8260B ()	8151A ()	8330 ()	6010B ()	7470A/1A ()	Other (x)													
	8270C ()	8081A ()	VPH ()	6020 ()	9014M ² /9012 ()														
8082 ()	8021B ()	EPH ()	7000 S ³ ()	7196A ()															
As specified in MADEP Compendium of Analytical Methods. (check all that apply)	<div style="border: 1px solid black; padding: 5px;"> 1 List Release Tracking Number (RTN), if known 2 M - SW-846 Method 9014 or MADEP Physiologically Available Cyanide (PAC) Method 3 S - SW-846 Methods 7000 Series List individual method and analyte. </div>																		

An affirmative response to questions A, B, C and D is required for "Presumptive Certainty" status

A	Were all samples received by the laboratory in a condition consistent with that described on the Chain-of-Custody documentation for the data set?	Yes √	No ¹
B	Were all QA/QC procedures required for the specified analytical method(s) included in this report followed, including the requirement to note and discuss in a narrative QC data that did not meet appropriate performance standards or guidelines?	Yes √	No ¹
C	Does the analytical data included in this report meet all the requirements for "Presumptive Certainty", as described in Section 2.0 (a), (b), (c) and (d) of the MADEP document CAM VII A, " Quality Assurance and Quality Control Guidelines for the Acquisition and Reporting of Analytical Data"?	Yes √	N/A No ¹
D	VPH and EPH methods only: Was the VPH or EPH Method conducted without significant modifications (see Section 11.3 of respective Methods)?	Yes √	N/A No ¹

A response to questions E and F below is required for "Presumptive Certainty" status

E	Were all QC performance standards and recommendations for the specified methods achieved?	Yes √	No ¹
F	Were results for all analyte-list compounds/elements for the specified method(s) reported?	Yes √	N/A No ¹

¹ All Negative responses must be addressed in an attached Environmental Laboratory case narrative.

I, the undersigned, attest under the pains and penalties of perjury that, based upon my personal inquiry of those responsible for obtaining the information, the material contained in this analytical report is, to the best of my knowledge and belief, accurate and complete.

Signature: 	Position: <u>Quality Assurance Manager</u>
Printed Name: <u>Christine Reynolds</u>	Date: <u>3/11/09 15:03</u>

The certification form has been electronically signed and approved.

CAM VII A, Rev 3.2

April-04

 <p>MADEP MA014 NY DOH 10843 RI DOH 57 CT DPH 0494 VT DECWSD</p>	<p>NELAP FL E87912 TOX NELAP NJ MA008 TOX NELAP NY 10843 NH DES 253901-A</p>	<p>TestAmerica Westfield 53 Southampton Rd, Westfield, MA 01085 Tel:(413)572-4000 Fax:(413)572-3707</p>
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WI-QA-037

CASE NARRATIVE

Client: Olin Corporation

Project: Slurry Wall/Cap

Report Number: 360-21354-1

This case narrative is in the form of an exception report, where only the anomalies related to this report, method specific performance and/or QA/QC issues are discussed. If there are no issues to report, this narrative will include a statement that documents that there are no relevant data issues as stipulated in the MCP reporting requirements.

In order to facilitate report review, a separate MCP Analytical Method Report Certification Form is included for each method requested.

It should be noted that samples with elevated Reporting Limits (RLs) as a result of a dilution may not be able to satisfy "MCP program" reporting limits in some cases if the "adjusted" RL is greater than the applicable MCP standards or criterion to which the concentration is being compared. Such increases in the RLs are an unavoidable but acceptable consequence of sample dilution that enables quantification of target analytes which exceed the calibration range.

Calculations are performed before rounding to avoid round-off errors in calculated results.

All holding times were met and proper preservation noted for the methods performed on these samples, unless otherwise detailed in the individual sections below.

The samples were received on 02/26/2009; the samples arrived in good condition, properly preserved and on ice. The temperature of the coolers at receipt was 2.2°C.

Note: All samples which require thermal preservation are considered acceptable if the arrival temperature is within 2C of the required temperature or method specified range. For samples with a specified temperature of 4C, samples with a temperature ranging from just above freezing temperature of water to 6C shall be acceptable. Samples that are hand delivered immediately following collection may not meet these criteria, however they will be deemed acceptable according to NELAC and MADEP standards, if there is evidence that the chilling process has begun, such as arrival on ice, etc.

MCP regulatory standard criteria were not specified for this report. Therefore, method reporting limits (RLs) were not assessed against any MCP standards as it may pertain to Question "E" on the Presumptive Certainty Certification Form (MADEP reference: WSC-CAM-AN-093008 - WSC-CAM Analytical Notes).

DISSOLVED METALS

Samples 360-21354-1 through 360-21354-6 were analyzed for dissolved metals in accordance with EPA SW846 Method 6010B. The samples were analyzed on 02/27/2009.

All QA/QC procedures required to meet Presumptive Certainty for the specified analytical method were performed as per section B of the MADEP MCP analytical method report Certification form.

All QC performance standards and recommendations, which may affect Data Usability for this specific method, were achieved.

General method information:

Chromium was detected in method blank MB 360-41739/2 at a level that was above the method detection limit but below the reporting limit. The value should be considered an estimate, and has been flagged "J". If the associated sample reported a result above the MDL and/or RL, the result has been "B" flagged. Refer to the QC report for details.

At the request of the client, an abbreviated/modified MCP analyte list was reported for this job.

The following reported methods are not listed in the MADEP Massachusetts Contingency Plan (MCP) Compendium of Analytical Methods (CAM), pursuant to the provisions of 310 CMR 40.0017(2).

ANIONS

Samples 360-21354-1 through 360-21354-6 were analyzed for anions in accordance with EPA Method 300.0. The samples were analyzed on 03/09/2009 and 03/10/2009.

All QC performance standards and recommendations for this specific method were achieved with the exception of:

Chloride failed the MS/MSD recovery criteria low for the matrix spike and matrix spike duplicate of sample 360-21354-5. The associated LCS recovered within control limits. Refer to the QC report for details.

Samples 360-21354-1 through 360-21354-5(10X), 360-21354-5(20X) and 360-21354-6(10X) required dilution prior to analysis. The reporting limits have been adjusted accordingly. Dilutions were due to high target concentration.

AMMONIA

Samples 360-21354-1 through 360-21354-6 were analyzed for ammonia in accordance with LACHAT 107-06-1B. The samples were prepared on 03/03/2009 and 03/05/2009 and analyzed on 03/04/2009 and 03/06/2009.

All QC performance standards and recommendations for this specific method were achieved with the exception of:

Ammonia failed the MS/MSD recovery criteria low for the matrix spike and matrix spike duplicate of sample 360-21354-2. The associated LCS recovered within control limits. Refer to the QC report for details.

Samples 360-21354-1(10X), 360-21354-2(10X), 360-21354-3(20X), 360-21354-4(10X), 360-21354-5(20X) and 360-21354-6(10X) required dilution prior to analysis. The reporting limits have been adjusted accordingly. Dilutions were due to high concentration.

SPECIFIC CONDUCTANCE (CONDUCTIVITY)

Samples 360-21354-1 through 360-21354-6 were analyzed for Specific Conductance (Conductivity) in accordance with SM 2510B. The samples were analyzed on 03/02/2009.

All QC performance standards and recommendations for this specific method were achieved.

This case narrative is available in Word format upon request.

METHOD SUMMARY

Client: Olin Corporation

Job Number: 360-21354-1

Description	Lab Location	Method	Preparation Method
Matrix: Water			
Dissolved Metals	TAL WFD	SW846 6010B	
Sample Filtration, Field	TAL WFD		FIELD_FLTRD
Chloride & Sulfate	TAL WFD	40CFR136A 300.0	
Nitrogen Ammonia	TAL WFD	LACHAT L107-06-1B	
Distillation, Ammonia	TAL WFD		Distill/Ammonia
Conductivity, Specific Conductance	TAL WFD	SM SM 2510B	

Lab References:

TAL WFD = TestAmerica Westfield

Method References:

40CFR136A = "Methods for Organic Chemical Analysis of Municipal Industrial Wastewater", 40CFR, Part 136, Appendix A, October 26, 1984 and subsequent revisions.

LACHAT = LACHAT

SM = "Standard Methods For The Examination Of Water And Wastewater",

SW846 = "Test Methods For Evaluating Solid Waste, Physical/Chemical Methods", Third Edition, November 1986 And Its Updates.

METHOD / ANALYST SUMMARY

Client: Olin Corporation

Job Number: 360-21354-1

Method	Analyst	Analyst ID
SW846 6010B	Nasiatka, Ellen M	EMN
40CFR136A 300.0	Lalashius, Andrew L	ALL
LACHAT L107-06-1B	Lalashius, Andrew L	ALL
SM SM 2510B	Emerich, Rich W	RWE

SAMPLE SUMMARY

Client: Olin Corporation

Job Number: 360-21354-1

Lab Sample ID	Client Sample ID	Client Matrix	Date/Time Sampled	Date/Time Received
360-21354-1	OC-GW-202S	Ground Water	02/25/2009 0910	02/26/2009 1650
360-21354-2	OC-PZ-18R	Ground Water	02/25/2009 1030	02/26/2009 1650
360-21354-3	OC-GW-79S	Ground Water	02/25/2009 1140	02/26/2009 1650
360-21354-4	OC-PZ-17RR	Ground Water	02/25/2009 1030	02/26/2009 1650
360-21354-5	OC-GW-202D	Ground Water	02/25/2009 0915	02/26/2009 1650
360-21354-6	OC-GW-78S	Ground Water	02/25/2009 1155	02/26/2009 1650

SAMPLE RESULTS

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-21354-1

Client Sample ID: OC-GW-202S
Lab Sample ID: 360-21354-1

Date Sampled: 02/25/2009 0910
Date Received: 02/26/2009 1650
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed: 02/27/2009 1449		
Aluminum	ND	ug/L	2.2	100	1.0
Chromium	4.3 JB	ug/L	0.17	5.0	1.0

W. J. Miller 5/19/09

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-21354-1

Client Sample ID: OC-GW-202S
Lab Sample ID: 360-21354-1

Date Sampled: 02/25/2009 0910
Date Received: 02/26/2009 1650
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0					
Sulfate	500	mg/L	20	20	10
Chloride	50 J	mg/L	10	10	10
Method: L107-06-1B					
Prep Method: Distill/Ammonia					
Ammonia	99	mg/L	1.0	1.0	10
Method: SM 2510B					
Specific Conductance	1400	umhos/cm	1.0	1.0	1.0

Signature 5/19/09

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-21354-1

Client Sample ID: OC-PZ-18R
Lab Sample ID: 360-21354-2

Date Sampled: 02/25/2009 1030
Date Received: 02/26/2009 1650
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed: 02/27/2009 1507		
Aluminum	4.6 J	ug/L	2.2	100	1.0
Chromium	15 B	ug/L	0.17	5.0	1.0

Handwritten signature: J. G. [unclear] 5/19/09

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-21354-1

Client Sample ID: OC-PZ-18R
Lab Sample ID: 360-21354-2

Date Sampled: 02/25/2009 1030
Date Received: 02/26/2009 1650
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0					
Sulfate	220	mg/L	20	20	10
Chloride	130 J	mg/L	10	10	10
Method: L107-06-1B					
Prep Method: Distill/Ammonia					
Ammonia	76	mg/L	1.0	1.0	10
Method: SM 2510B					
Specific Conductance	1000	umhos/cm	1.0	1.0	1.0

[Handwritten Signature] 5/19/09

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-21354-1

Client Sample ID: OC-GW-79S
Lab Sample ID: 360-21354-3

Date Sampled: 02/25/2009 1140
Date Received: 02/26/2009 1650
Client Matrix: Ground Water

Analyte	Result/Qualifier		Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed:	02/27/2009 1510		
Aluminum	18	J	ug/L	2.2	100	1.0
Chromium	6.6	B	ug/L	0.17	5.0	1.0

Date Analyzed: 02/27/2009 1510

Handwritten signature 5/12/09

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-21354-1

Client Sample ID: OC-GW-79S
Lab Sample ID: 360-21354-3

Date Sampled: 02/25/2009 1140
Date Received: 02/26/2009 1650
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0			Date Analyzed:	03/09/2009 2159	
Sulfate	1100	mg/L	20	20	10
Chloride	170 J	mg/L	10	10	10
Method: L107-06-1B			Date Analyzed:	03/06/2009 1333	
Prep Method: Distill/Ammonia			Date Prepared:	03/05/2009 1145	
Ammonia	190	mg/L	2.0	2.0	20
Method: SM 2510B			Date Analyzed:	03/02/2009 1203	
Specific Conductance	3200	umhos/cm	1.0	1.0	1.0

W. W. W. W. 5/19/09

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-21354-1

Client Sample ID: OC-PZ-17RR
Lab Sample ID: 360-21354-4

Date Sampled: 02/25/2009 1030
Date Received: 02/26/2009 1650
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed: 02/27/2009 1513		
Aluminum	4.6 J	ug/L	2.2	100	1.0
Chromium	2.9 JB	ug/L	0.17	5.0	1.0

Stacy C. Cline 5/19/09

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-21354-1

Client Sample ID: OC-PZ-17RR
Lab Sample ID: 360-21354-4

Date Sampled: 02/25/2009 1030
Date Received: 02/26/2009 1650
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0 Chloride	17 <i>J</i>	mg/L	1.0	1.0	1.0
Method: 300.0 Sulfate	510	mg/L	20	20	10
Method: L107-06-1B Prep Method: Distill/Ammonia Ammonia	75	mg/L	1.0	1.0	10
Method: SM 2510B Specific Conductance	1400	umhos/cm	1.0	1.0	1.0

[Signature] 5/19/09

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-21354-1

Client Sample ID: OC-GW-202D
Lab Sample ID: 360-21354-5

Date Sampled: 02/25/2009 0915
Date Received: 02/26/2009 1650
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed: 02/27/2009 1516		
Aluminum	14000	ug/L	2.2	100	1.0
Chromium	940	ug/L	0.17	5.0	1.0

W. J. P. 2/27/09 5/19/09

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-21354-1

Client Sample ID: OC-GW-202D
Lab Sample ID: 360-21354-5

Date Sampled: 02/25/2009 0915
Date Received: 02/26/2009 1650
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0 Chloride	300 5	mg/L	10	10	10
Method: 300.0 Sulfate	2000	mg/L	40	40	20
Method: L107-06-1B Prep Method: Distill/Ammonia Ammonia	360	mg/L	2.0	2.0	20
Method: SM 2510B Specific Conductance	5100	umhos/cm	1.0	1.0	1.0

 5/19/09

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-21354-1

Client Sample ID: OC-GW-78S
Lab Sample ID: 360-21354-6

Date Sampled: 02/25/2009 1155
Date Received: 02/26/2009 1650
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	MDL	RL	Dilution
Method: Dissolved-6010B			Date Analyzed: 02/27/2009 1519		
Aluminum	7.7 J	ug/L	2.2	100	1.0
Chromium	5.5 B	ug/L	0.17	5.0	1.0

W. J. D. Carter 5/19/09

Mr. Steven Morrow
Olin Corporation
3855 North Ocoee Street
Suite 200
Cleveland, TN 37312-4441

Job Number: 360-21354-1

Client Sample ID: OC-GW-78S
Lab Sample ID: 360-21354-6

Date Sampled: 02/25/2009 1155
Date Received: 02/26/2009 1650
Client Matrix: Ground Water

Analyte	Result/Qualifier	Unit	RL	RL	Dilution
Method: 300.0 Chloride	22 <i>J</i>	mg/L	1.0	1.0	1.0
Method: 300.0 Sulfate	620	mg/L	20	20	10
Method: L107-06-1B Prep Method: Distill/Ammonia Ammonia	94	mg/L	1.0	1.0	10
Method: SM 2510B Specific Conductance	1300	umhos/cm	1.0	1.0	1.0

W. J. Morrow 5/19/09

DATA REPORTING QUALIFIERS

Client: Olin Corporation

Job Number: 360-21354-1

Lab Section	Qualifier	Description
Metals		
	B	Compound was found in the blank and sample.
	J	Result is less than the RL but greater than or equal to the MDL and the concentration is an approximate value.
General Chemistry		
	F	MS or MSD exceeds the control limits
	4	MS, MSD: The analyte present in the original sample is 4 times greater than the matrix spike concentration; therefore, control limits are not applicable.

QUALITY CONTROL RESULTS

Quality Control Results

Client: Olin Corporation

Job Number: 360-21354-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
Metals					
Analysis Batch:360-41739					
LCS 360-41739/1	Lab Control Spike	T	Water	6010B	
LCSD 360-41739/7	Lab Control Spike Duplicate	T	Water	6010B	
MB 360-41739/2	Method Blank	T	Water	6010B	
360-21354-1	OC-GW-202S	D	Water	6010B	
360-21354-1DU	Duplicate	D	Water	6010B	
360-21354-1MS	Matrix Spike	D	Water	6010B	
360-21354-2	OC-PZ-18R	D	Water	6010B	
360-21354-3	OC-GW-79S	D	Water	6010B	
360-21354-4	OC-PZ-17RR	D	Water	6010B	
360-21354-5	OC-GW-202D	D	Water	6010B	
360-21354-6	OC-GW-78S	D	Water	6010B	

Report Basis

D = Dissolved

T = Total

Quality Control Results

Client: Olin Corporation

Job Number: 360-21354-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
General Chemistry					
Analysis Batch:360-41761					
LCS 360-41761/1	Lab Control Spike	T	Water	SM 2510B	
MB 360-41761/12	Method Blank	T	Water	SM 2510B	
360-21354-1	OC-GW-202S	T	Water	SM 2510B	
360-21354-2	OC-PZ-18R	T	Water	SM 2510B	
360-21354-3	OC-GW-79S	T	Water	SM 2510B	
360-21354-4	OC-PZ-17RR	T	Water	SM 2510B	
360-21354-5	OC-GW-202D	T	Water	SM 2510B	
360-21354-6	OC-GW-78S	T	Water	SM 2510B	
360-21354-6DU	Duplicate	T	Water	SM 2510B	
Prep Batch: 360-41845					
LCS 360-41845/2-A	Lab Control Spike	T	Water	Distill/Ammonia	
MB 360-41845/1-A	Method Blank	T	Water	Distill/Ammonia	
360-21354-1	OC-GW-202S	T	Water	Distill/Ammonia	
Analysis Batch:360-41860					
LCS 360-41845/2-A	Lab Control Spike	T	Water	L107-06-1B	360-41845
MB 360-41845/1-A	Method Blank	T	Water	L107-06-1B	360-41845
360-21354-1	OC-GW-202S	T	Water	L107-06-1B	360-41845
Prep Batch: 360-41915					
LCS 360-41915/2-A	Lab Control Spike	T	Water	Distill/Ammonia	
MB 360-41915/1-A	Method Blank	T	Water	Distill/Ammonia	
360-21354-2	OC-PZ-18R	T	Water	Distill/Ammonia	
360-21354-2MS	Matrix Spike	T	Water	Distill/Ammonia	
360-21354-2MSD	Matrix Spike Duplicate	T	Water	Distill/Ammonia	
360-21354-3	OC-GW-79S	T	Water	Distill/Ammonia	
360-21354-4	OC-PZ-17RR	T	Water	Distill/Ammonia	
360-21354-5	OC-GW-202D	T	Water	Distill/Ammonia	
360-21354-6	OC-GW-78S	T	Water	Distill/Ammonia	
Analysis Batch:360-41958					
LCS 360-41915/2-A	Lab Control Spike	T	Water	L107-06-1B	360-41915
MB 360-41915/1-A	Method Blank	T	Water	L107-06-1B	360-41915
360-21354-2	OC-PZ-18R	T	Water	L107-06-1B	360-41915
360-21354-2MS	Matrix Spike	T	Water	L107-06-1B	360-41915
360-21354-2MSD	Matrix Spike Duplicate	T	Water	L107-06-1B	360-41915
360-21354-3	OC-GW-79S	T	Water	L107-06-1B	360-41915
360-21354-4	OC-PZ-17RR	T	Water	L107-06-1B	360-41915
360-21354-5	OC-GW-202D	T	Water	L107-06-1B	360-41915
360-21354-6	OC-GW-78S	T	Water	L107-06-1B	360-41915

TestAmerica Westfield

Quality Control Results

Client: Olin Corporation

Job Number: 360-21354-1

QC Association Summary

Lab Sample ID	Client Sample ID	Report Basis	Client Matrix	Method	Prep Batch
General Chemistry					
Analysis Batch:360-42066					
LCS 360-42066/2	Lab Control Spike	T	Water	300.0	
MB 360-42066/1	Method Blank	T	Water	300.0	
360-21354-1	OC-GW-202S	T	Water	300.0	
360-21354-2	OC-PZ-18R	T	Water	300.0	
360-21354-3	OC-GW-79S	T	Water	300.0	
360-21354-4	OC-PZ-17RR	T	Water	300.0	
Analysis Batch:360-42067					
LCS 360-42067/2	Lab Control Spike	T	Water	300.0	
MB 360-42067/1	Method Blank	T	Water	300.0	
360-21354-5	OC-GW-202D	T	Water	300.0	
360-21354-5MS	Matrix Spike	T	Water	300.0	
360-21354-5MSD	Matrix Spike Duplicate	T	Water	300.0	
360-21354-6	OC-GW-78S	T	Water	300.0	
Analysis Batch:360-42070					
LCS 360-42070/2	Lab Control Spike	T	Water	300.0	
MB 360-42070/1	Method Blank	T	Water	300.0	
360-21354-5	OC-GW-202D	T	Water	300.0	
360-21354-5MS	Matrix Spike	T	Water	300.0	
360-21354-5MSD	Matrix Spike Duplicate	T	Water	300.0	

Report Basis

T = Total

Quality Control Results

Client: Olin Corporation

Job Number: 360-21354-1

Method Blank - Batch: 360-41739

Method: 6010B
Preparation: N/A

disolved @ 5/10/09
~~total~~

Lab Sample ID: MB 360-41739/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 02/27/2009 1429
Date Prepared: N/A

Analysis Batch: 360-41739
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 1.0 mL

Analyte	Result	Qual	MDL	RL
Aluminum	ND		2.2	100
Chromium	0.24	J	0.17	5.0

Lab Control Spike/ Lab Control Spike Duplicate Recovery Report - Batch: 360-41739

Method: 6010B
Preparation: N/A

LCS Lab Sample ID: LCS 360-41739/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 02/27/2009 1426
Date Prepared: N/A

Analysis Batch: 360-41739
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 10 mL

LCSD Lab Sample ID: LCSD 360-41739/7
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 02/27/2009 1501
Date Prepared: N/A

Analysis Batch: 360-41739
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 10 mL

Analyte	% Rec.		Limit	RPD	RPD Limit	LCS Qual	LCSD Qual
	LCS	LCSD					
Aluminum	98	97	80 - 120	1	20		
Chromium	99	98	80 - 120	1	20		

Calculations are performed before rounding to avoid round-off errors in calculated results.

Quality Control Results

Client: Olin Corporation

Job Number: 360-21354-1

Matrix Spike - Batch: 360-41739

Method: 6010B
Preparation: N/A

Lab Sample ID: 360-21354-1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 02/27/2009 1455
Date Prepared: N/A

Analysis Batch: 360-41739
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 10 mL

Analyte	Sample Result/Qual	Spike Amount	Result	% Rec.	Limit	Qual
Aluminum	ND	5000	4700	94 ✓	75 - 125	
Chromium	4.3 J	1000	931	93 ✓	75 - 125	

Duplicate - Batch: 360-41739

Method: 6010B
Preparation: N/A

Lab Sample ID: 360-21354-1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 02/27/2009 1452
Date Prepared: N/A

Analysis Batch: 360-41739
Prep Batch: N/A
Units: ug/L

Instrument ID: Varian 720 ES ICP
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 1.0 mL

Analyte	Sample Result/Qual	Result	RPD	Limit	Qual
Aluminum	ND	ND	NC ✓	20	
Chromium	4.3 J	4.24	1 ✓	20	J

Calculations are performed before rounding to avoid round-off errors in calculated results.

Quality Control Results

Client: Olin Corporation

Job Number: 360-21354-1

Method Blank - Batch: 360-42066

Method: 300.0
Preparation: N/A

Lab Sample ID: MB 360-42066/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/09/2009 1641
Date Prepared: N/A

Analysis Batch: 360-42066
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 1.0 mL

Analyte	Result	Qual	RL	RL
Sulfate	ND ✓		2.0	2.0
Chloride	ND ✓		1.0	1.0

Lab Control Spike - Batch: 360-42066

Method: 300.0
Preparation: N/A

Lab Sample ID: LCS 360-42066/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/09/2009 1656
Date Prepared: N/A

Analysis Batch: 360-42066
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 1.0 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Sulfate	80.0	80.2	100 ✓	85 - 115	
Chloride	40.0	40.1	100 ✓	85 - 115	

Calculations are performed before rounding to avoid round-off errors in calculated results.

Quality Control Results

Client: Olin Corporation

Job Number: 360-21354-1

Method Blank - Batch: 360-42067

Method: 300.0
Preparation: N/A

Lab Sample ID: MB 360-42067/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/09/2009 2315
Date Prepared: N/A

Analysis Batch: 360-42067
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 1.0 mL

Analyte	Result	Qual	RL	RL
Sulfate	ND ✓		2.0	2.0
Chloride	ND ✓		1.0	1.0

Lab Control Spike - Batch: 360-42067

Method: 300.0
Preparation: N/A

Lab Sample ID: LCS 360-42067/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/09/2009 2330
Date Prepared: N/A

Analysis Batch: 360-42067
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 1.0 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Sulfate	80.0	80.4	100 ✓	85 - 115	
Chloride	40.0	40.1	100 ✓	85 - 115	

Calculations are performed before rounding to avoid round-off errors in calculated results.

Quality Control Results

Client: Olin Corporation

Job Number: 360-21354-1

**Matrix Spike/
Matrix Spike Duplicate Recovery Report - Batch: 360-42067**

**Method: 300.0
Preparation: N/A**

MS Lab Sample ID: 360-21354-5
Client Matrix: Water
Dilution: 10
Date Analyzed: 03/10/2009 0015
Date Prepared: N/A

Analysis Batch: 360-42067
Prep Batch: N/A

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 10 mL

MSD Lab Sample ID: 360-21354-5
Client Matrix: Water
Dilution: 10
Date Analyzed: 03/10/2009 0030
Date Prepared: N/A

Analysis Batch: 360-42067
Prep Batch: N/A

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 10 mL

Analyte	% Rec.		Limit	RPD	RPD Limit	MS Qual	MSD Qual
	MS	MSD					
Chloride	70	66	75 - 125	5.9	20	F	F

W. J. White
5/12/09

Calculations are performed before rounding to avoid round-off errors in calculated results.

Quality Control Results

Client: Olin Corporation

Job Number: 360-21354-1

Method Blank - Batch: 360-42070

Method: 300.0
Preparation: N/A

Lab Sample ID: MB 360-42070/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/10/2009 1617
Date Prepared: N/A

Analysis Batch: 360-42070
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 1.0 mL

Analyte	Result	Qual	RL	RL
Sulfate	ND ✓		2.0	2.0
Chloride	ND ✓		1.0	1.0

Lab Control Spike - Batch: 360-42070

Method: 300.0
Preparation: N/A

Lab Sample ID: LCS 360-42070/2
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/10/2009 1632
Date Prepared: N/A

Analysis Batch: 360-42070
Prep Batch: N/A
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 1.0 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Sulfate	80.0	79.3	99 ✓	85 - 115	
Chloride	40.0	39.8	99 ✓	85 - 115	

Calculations are performed before rounding to avoid round-off errors in calculated results.

Quality Control Results

Client: Olin Corporation

Job Number: 360-21354-1

Matrix Spike/ Matrix Spike Duplicate Recovery Report - Batch: 360-42070

Method: 300.0
Preparation: N/A

MS Lab Sample ID: 360-21354-5
Client Matrix: Water
Dilution: 20
Date Analyzed: 03/10/2009 1702
Date Prepared: N/A

Analysis Batch: 360-42070
Prep Batch: N/A

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 10 mL

MSD Lab Sample ID: 360-21354-5
Client Matrix: Water
Dilution: 20
Date Analyzed: 03/10/2009 1717
Date Prepared: N/A

Analysis Batch: 360-42070
Prep Batch: N/A

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 10 mL

Analyte	% Rec.		Limit	RPD	RPD Limit	MS Qual	MSD Qual
	MS	MSD					
Sulfate	80	78	75 - 125	0	20	4	4

2.5
3/10/09

Calculations are performed before rounding to avoid round-off errors in calculated results.

Quality Control Results

Client: Olin Corporation

Job Number: 360-21354-1

Method Blank - Batch: 360-41845

Method: L107-06-1B
Preparation: Distill/Ammonia

Lab Sample ID: MB 360-41845/1-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/04/2009 1714
Date Prepared: 03/03/2009 1320

Analysis Batch: 360-41860
Prep Batch: 360-41845
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 50 mL

Analyte	Result	Qual	RL	RL
Ammonia	ND /		0.10	0.10

Lab Control Spike - Batch: 360-41845

Method: L107-06-1B
Preparation: Distill/Ammonia

Lab Sample ID: LCS 360-41845/2-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/04/2009 1715
Date Prepared: 03/03/2009 1320

Analysis Batch: 360-41860
Prep Batch: 360-41845
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 50 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Ammonia	10.0	9.44	94 /	85 - 115	

Calculations are performed before rounding to avoid round-off errors in calculated results.

Quality Control Results

Client: Olin Corporation

Job Number: 360-21354-1

Method Blank - Batch: 360-41915

Method: L107-06-1B
Preparation: Distill/Ammonia

Lab Sample ID: MB 360-41915/1-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/06/2009 1307
Date Prepared: 03/05/2009 1145

Analysis Batch: 360-41958
Prep Batch: 360-41915
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 50 mL

Analyte	Result	Qual	RL	RL
Ammonia	ND /		0.10	0.10

Lab Control Spike - Batch: 360-41915

Method: L107-06-1B
Preparation: Distill/Ammonia

Lab Sample ID: LCS 360-41915/2-A
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/06/2009 1308
Date Prepared: 03/05/2009 1145

Analysis Batch: 360-41958
Prep Batch: 360-41915
Units: mg/L

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 50 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Ammonia	10.0	9.20	92 /	85 - 115	

Matrix Spike/ Matrix Spike Duplicate Recovery Report - Batch: 360-41915

Method: L107-06-1B
Preparation: Distill/Ammonia

MS Lab Sample ID: 360-21354-2
Client Matrix: Water
Dilution: 10
Date Analyzed: 03/06/2009 1332
Date Prepared: 03/05/2009 1145

Analysis Batch: 360-41958
Prep Batch: 360-41915

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 50 mL

MSD Lab Sample ID: 360-21354-2
Client Matrix: Water
Dilution: 10
Date Analyzed: 03/06/2009 1332
Date Prepared: 03/05/2009 1145

Analysis Batch: 360-41958
Prep Batch: 360-41915

Instrument ID: No Equipment Assigned
Lab File ID: N/A
Initial Weight/Volume: 1.0 mL
Final Weight/Volume: 50 mL

Analyte	% Rec.		Limit	RPD	RPD Limit	MS Qual	MSD Qual
	MS	MSD					
Ammonia	1	-86	75 - 125	12	20	4	4

195 *[Signature]* 5/13/09

Calculations are performed before rounding to avoid round-off errors in calculated results.

Quality Control Results

Client: Olin Corporation

Job Number: 360-21354-1

Method Blank - Batch: 360-41761

Method: SM 2510B
Preparation: N/A

Lab Sample ID: MB 360-41761/12
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/02/2009 1212
Date Prepared: N/A

Analysis Batch: 360-41761
Prep Batch: N/A
Units: umhos/cm

Instrument ID: MAN-TECH Ion Plus
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 1.0 mL

Analyte	Result	Qual	RL	RL
Specific Conductance	ND		1.0	1.0

Lab Control Spike - Batch: 360-41761

Method: SM 2510B
Preparation: N/A

Lab Sample ID: LCS 360-41761/1
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/02/2009 1156
Date Prepared: N/A

Analysis Batch: 360-41761
Prep Batch: N/A
Units: umhos/cm

Instrument ID: MAN-TECH Ion Plus
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 1.0 mL

Analyte	Spike Amount	Result	% Rec.	Limit	Qual
Specific Conductance	1420	1410	99	85 - 115	

Duplicate - Batch: 360-41761

Method: SM 2510B
Preparation: N/A

Lab Sample ID: 360-21354-6
Client Matrix: Water
Dilution: 1.0
Date Analyzed: 03/02/2009 1209
Date Prepared: N/A

Analysis Batch: 360-41761
Prep Batch: N/A
Units: umhos/cm

Instrument ID: MAN-TECH Ion Plus Autoti
Lab File ID: N/A
Initial Weight/Volume:
Final Weight/Volume: 1.0 mL

Analyte	Sample Result/Qual	Result	RPD	Limit	Qual
Specific Conductance	1300	1340	3.0	20	

m/ptch
5/19/09

Calculations are performed before rounding to avoid round-off errors in calculated results.

Login Sample Receipt Check List

Client: Olin Corporation

Job Number: 360-21354-1

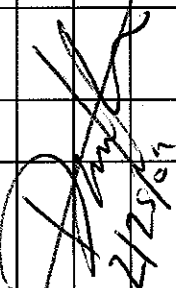
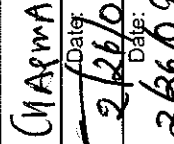
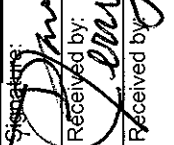
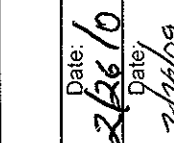
Login Number: 21354

List Source: TestAmerica Westfield

Creator: Rinard, Kimberley A

List Number: 1

Question	T / F / NA	Comment
Radioactivity either was not measured or, if measured, is at or below background	N/A	
The cooler's custody seal, if present, is intact.	N/A	
The cooler or samples do not appear to have been compromised or tampered with.	True	
Samples were received on ice.	True	
Cooler Temperature is acceptable.	True	2.2 C
Cooler Temperature is recorded.	True	
COC is present.	True	
COC is filled out in ink and legible.	True	
COC is filled out with all pertinent information.	True	
There are no discrepancies between the sample IDs on the containers and the COC.	True	
Samples are received within Holding Time.	True	
Sample containers have legible labels.	True	
Containers are not broken or leaking.	True	
Sample collection date/times are provided.	True	
Appropriate sample containers are used.	True	
Sample bottles are completely filled.	True	
There is sufficient vol. for all requested analyses, incl. any requested MS/MSDs	True	
VOA sample vials do not have headspace or bubble is <6mm (1/4") in diameter.	N/A	
If necessary, staff have been informed of any short hold time or quick TAT needs	True	
Multiphasic samples are not present.	True	
Samples do not require splitting or compositing.	True	

Client: Olin Chemical/MACTEC		Project #: 610790016/04		Job#		Quote#										
Address: 51 Eames Street Wilmington, MA 01887		Project Manager: PETER THOMPSON Work ID: PEMP Surgery Wallcar		Shaded areas for office use		Comments (Special Instructions)										
Phone: _____ Fax: _____		Contact: David Chapman		Analysis Requested Check analysis and specify method and analytes in comments section. For example: 500-series for drinking water 600-series for waste water 8000-series for haz/solid waste Use comments section to further define.		MCP case narrative										
Regulatory Classification / Special Report Format NPDES _____ Drinking Water _____ DEP Form(s) _____ RCRA _____ MCP GW/IS1 _____ MWRA Smart Rpt _____ Other _____ MCP QA/QC Rpt XX		Sample Type Codes WW-Wastewater DW-Drinking water SW-Surfacewater LW-Labwater GW-Groundwater A-Air S-Solid / Soil SL-Sludge O-Oil Z-Other		Preservative NaHSO4/MeOH _____ HNO3 to pH < 2 _____ H2SO4 to pH < 2 _____ HCl to pH < 2 _____ NaOH to pH > 12 _____ NaOH/ZnAC _____ None / 4° C _____		Dissolved metals are field filtered. Groundwater Metals: Dissolved Al/Cr Surfacewater Metals: Dissolved/Total Al/Cr/Na										
Sample ID	Sample Type	Sample's Initials	Date Collected	Comp.	# Containers	Plastic(P) or Glass(G)	Chloride, Sulfate	Specific Conductivity	Nitrate, Nitrite, DIN	Groundwater metals	Surfacewater metals	Sediment: Al/Cr/Fe	Other	Other	Other	
OC - GW - 2025	GW	DLG	2/25/09 0910	X	3	P	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
OC - PZ - 18R		DLG	2/25/09 1030	X	3	P	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
OC - GW - 79S		DLG	2/25/09 1140	X	3	P	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
OC - PZ - 17RR		DLG	2/25/09 1030	X	3	P	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
OC - GW - 202D		DLG	2/25/09 0915	X	3	P	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
OC - GW - 78S		DLG	2/25/09 1155	X	3	P	XX	XX	XX	XX	XX	XX	XX	XX	XX	XX
																
Sampled by (print):		DARON KURKJIAN/DAVID CHAPMAN		Signature:				Cooler ? () N Samples Iced ? () / N								
Relinquished by:		DAVID CHAPMAN		Received by:				Temp @ receipt: 22°C								
Relinquished by:		DAVID CHAPMAN		Received by:				Preservation/pH checked								
Method of shipment:		2/26/09 1650		Date:		2/26/09 1650		By: VAW Date: 2/26/09								